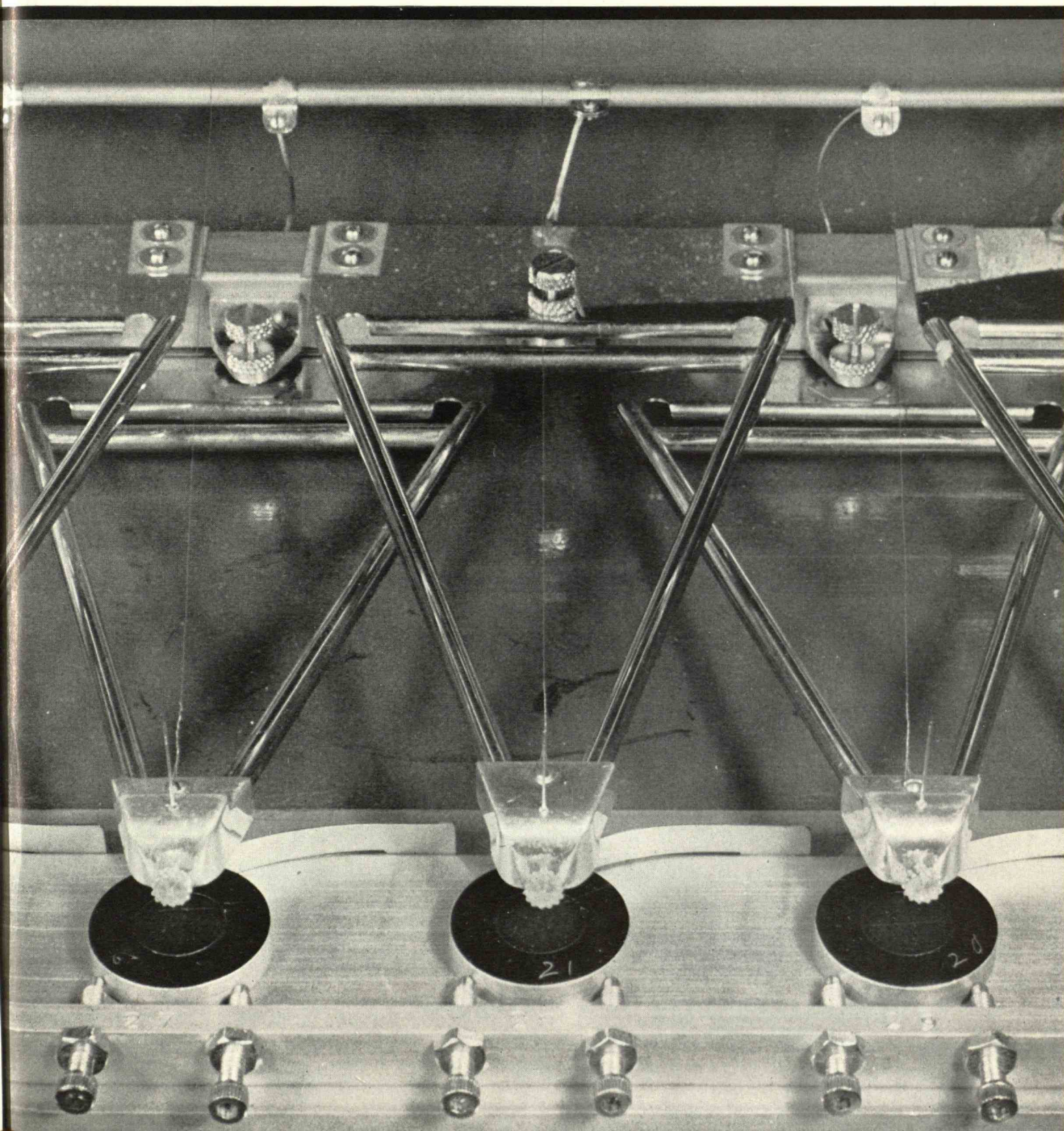
December 1944

TECHNOLOGY REVIEW

Title Reg. in U. S. Pat. Office



technology
review
Published by MIT

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EVOLUTION

OF A *Machined* ALUMINUM FORGING

THE

HARVEY

METAL CORPORATION

HAROLD B. HARVEY '05 • *Engineers & Manufacturers* • SHERRY O'BRIEN '17

74th STREET and ASHLAND AVENUE • CHICAGO 36, ILLINOIS

FORGINGS IN ALUMINUM • BRASS • BRONZE • COPPER • MAGNESIUM • MONEL • ALLOYS

MACHINING FACILITIES



A Small Purchase That May Cost You $1000

WHEN one of your workers suddenly claps a hand over an injured eye, it frequently means a lifetime handicap for him . . . and *always* increases your cost of production.

For the glass eye you may have to buy him is only a small part of your total expenditure . . . which can easily amount to $1000 or more before you are through.

Yet all this can usually be avoided for as little as $1.50 per man—75c an eye—the price of scientific AO eye protection. For these AO Safety Goggles protect each worker on his particular job . . . help him to *concentrate.*

Your Safety Director would welcome *your* help in establishing an adequate goggle program. Why not discuss this with him, and call in an AO Safety Engineer to make an eye-hazard survey of your plant? You'll find it's a short cut to lower production costs.

American Optical
COMPANY
SOUTHBRIDGE, MASSACHUSETTS



THE TECHNOLOGY REVIEW, December, 1944. Vol. XLVII, No. 2. Published monthly from November to July inclusive at 10 Ferry Street, Concord, N. H. Publication date: twenty-seventh of the month preceding date of issue. Annual subscription, $3.50; Canadian and foreign subscription, $4.00. Entered as second-class matter at the Post Office at Concord, N. H., under the Act of March 3, 1879.

Constant Hair-splitting to give you Constant Performance

The great part that close tolerances play is one of the reasons why Busch-Sulzer Diesels are noted for their ability to give year after year of reliable and economical service.

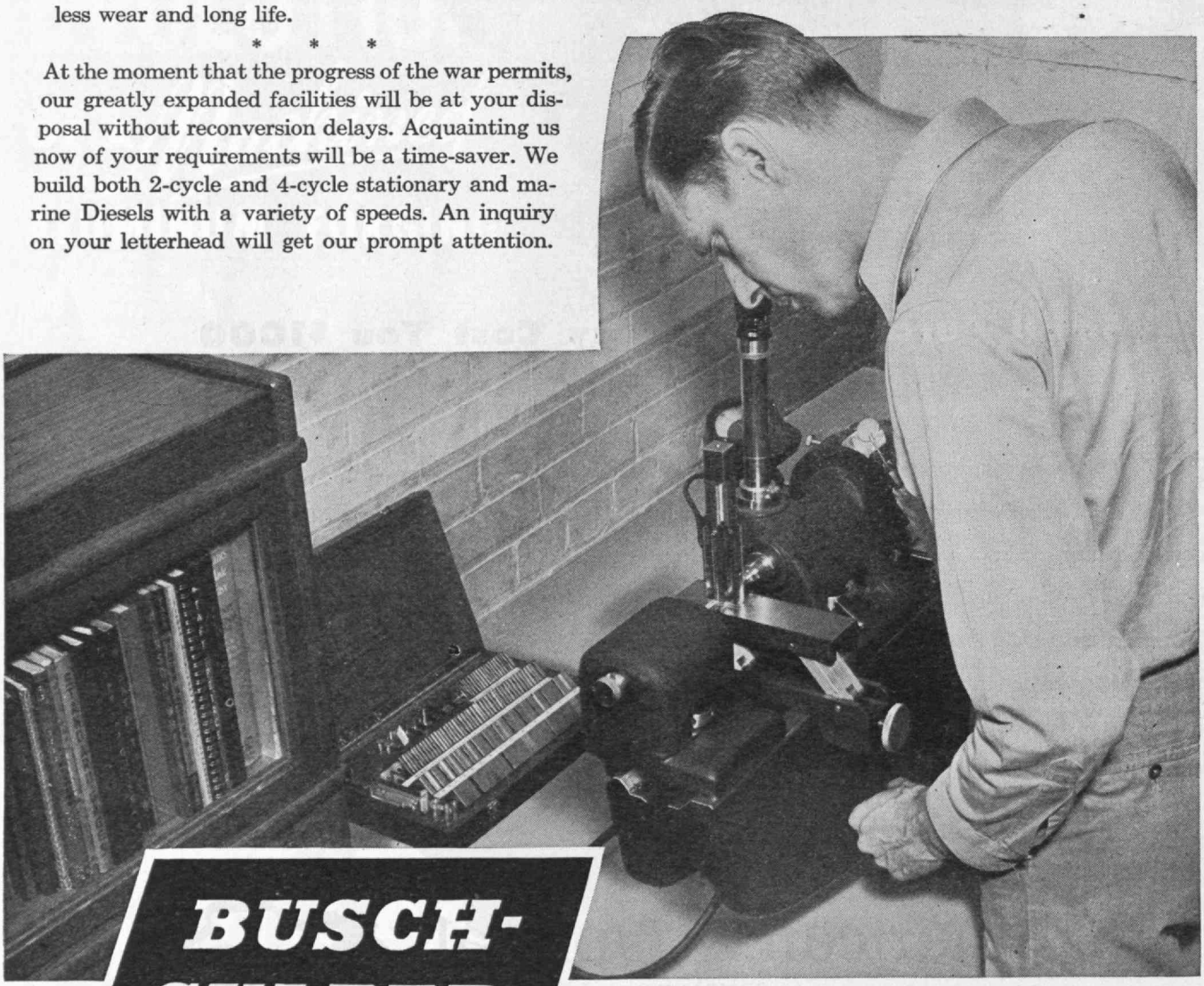
For example, every eight hours, when a new shift reports, all gages are given a microscopic examination capable of disclosing errors in millionths of an inch. Only when a cross-hair exactly splits two other cross-hairs is the gage under examination up to Bureau of Standards specifications and ready for work.

This hair-splitting precision plus the skill of America's oldest builder of Diesels has resulted in engines famous for their simplicity of design, which makes for fewer moving parts, better lubrication, less wear and long life.

* * *

At the moment that the progress of the war permits, our greatly expanded facilities will be at your disposal without reconversion delays. Acquainting us now of your requirements will be a time-saver. We build both 2-cycle and 4-cycle stationary and marine Diesels with a variety of speeds. An inquiry on your letterhead will get our prompt attention.

By actually splitting two tiny cross-hairs with a third cross-hair, this microscopic inspecting instrument puts the O. K. for accuracy on the many gages used in Busch-Sulzer's close tolerance work.



BUSCH-SULZER
ST. LOUIS

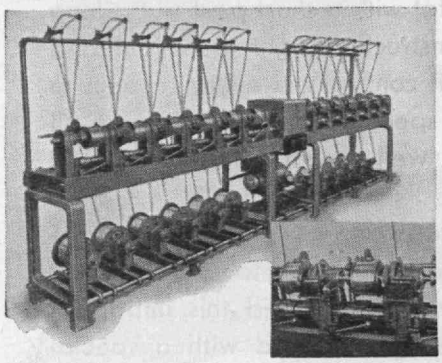
BUSCH-SULZER BROS.– DIESEL ENGINE COMPANY
SAINT LOUIS

America's Oldest Builder of DIESEL ENGINES

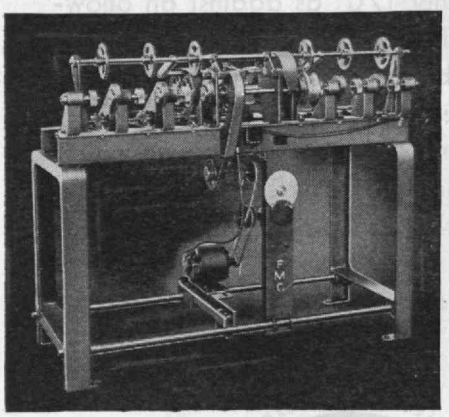


BONDS—Buy them now to bring the boys down the home stretch

FIDELITY
WIRE SPOOLING MACHINES



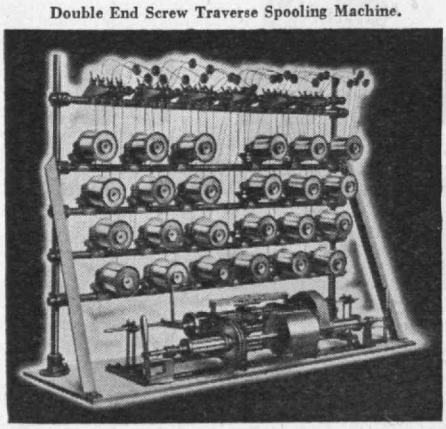
Every winding head equipped with large-figure footage counters, conveniently located for inspection and control by operator.

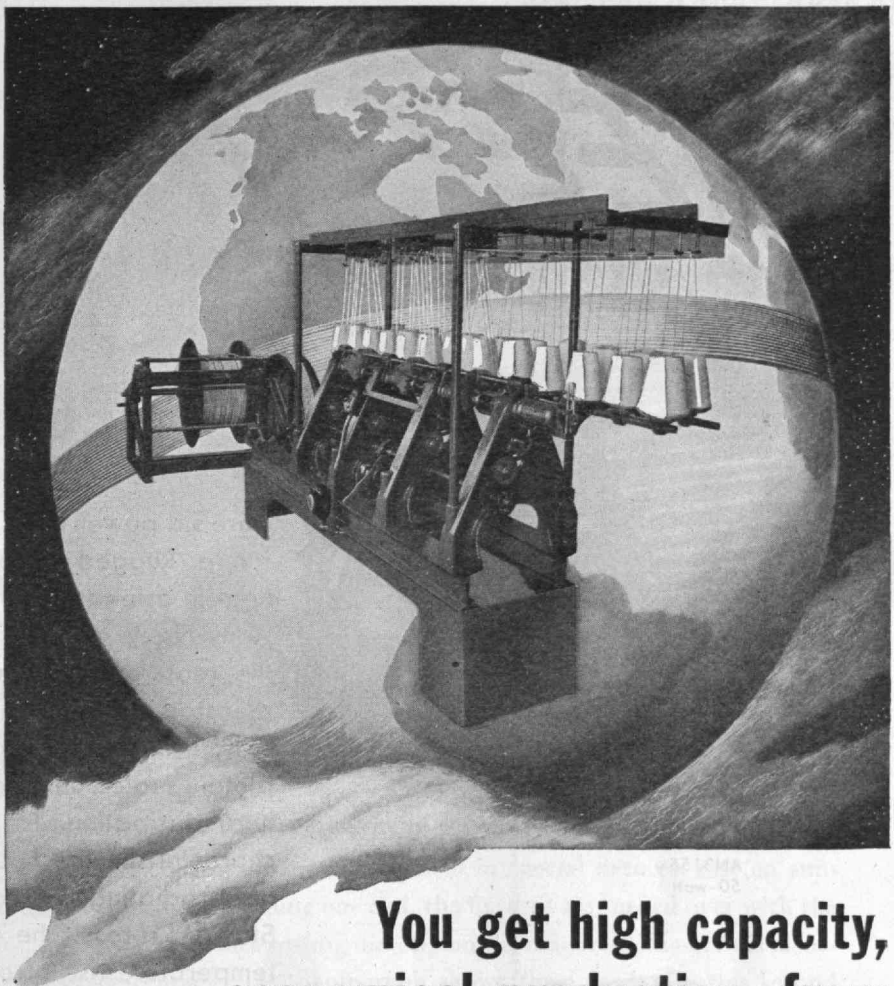


Screw-Type Wire Winding Machine.

★

Double End Screw Traverse Spooling Machine.





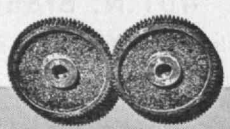
You get high capacity, economical production, from FIDELITY-SINFRA Wire Covering Machines

Already enough weatherproof wire has been covered on FIDELITY-Sinfra Wire Covering Machines since Pearl Harbor to circle the earth twenty or more times.

Three (or less) covers of cotton, linen or other fibres can be knitted on simultaneously at double and triple pre-war speeds. Round, square or rectangular wires and strip or cable of metal, plastic or other materials can be given one, two or three knitted covers ready for impregnation. Speeds 1200 to 1500 ft. per hour.

Wire up to No. 6 gauge or strip up to ¾" wide can be handled on these FIDELITY Machines. Interchangeable heads permit use of same machine for more than one size. This is but one of a number of FIDELITY Machines of special interest if you have wire insulating or wire winding operations in your plant — all high capacity, economical machines that provide close control of cost and reliable, uniform production.

Write for special bulletins on wire covering and wire winding machines.

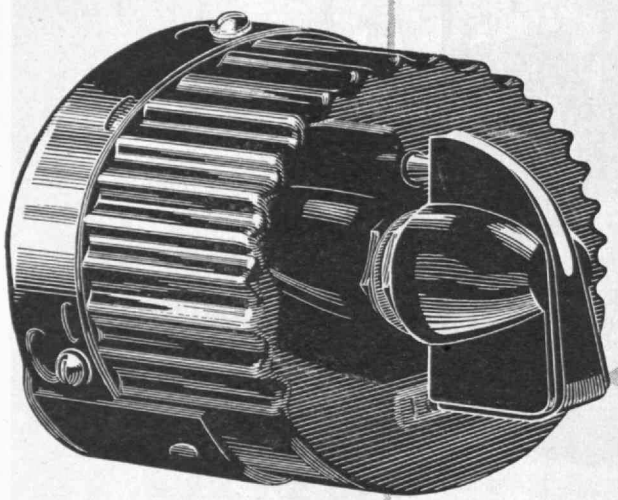
Intricate Automatic  *Precision Machines*

FIDELITY MACHINE COMPANY

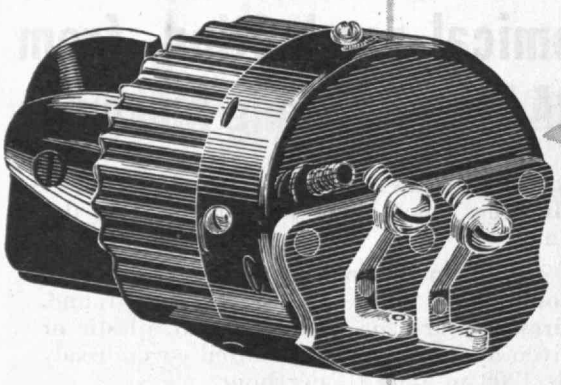
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MEET IRC'S...

AN3155
POWER RHEOSTAT



AN3155
50-watt



AN3155
25-watt;
showing terminal
positions

Here's a power rheostat with a *short* past but a *long* future. Rugged in construction, light in weight and neat in appearance, it conforms in every respect to Army-Navy AN3155 specifications. It embraces all the features of IRC's well-known PR25 and PR50 rheostats.

Both the winding core and housing, of this completely sealed unit, are of aluminum to effect greater heat dissipation. To still further aid this important characteristic the housing is coated with a special heat-radiating finish developed by the IRC Research Staff. As a result the AN3155 generates a maximum temperature rise of only 170° as against an allowable 300°. Another feature of interest is the fact that the AN3155 can be operated at full power load in as low as 25% rotation.

Available in 25 or 50 watt models with either linear or tapered windings, the IRC AN3155 should find many useful post-war applications in the aviation industry.

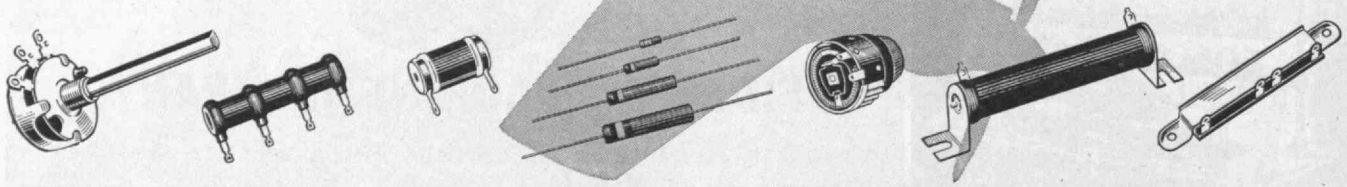
Technical data and further information will be sent on request.

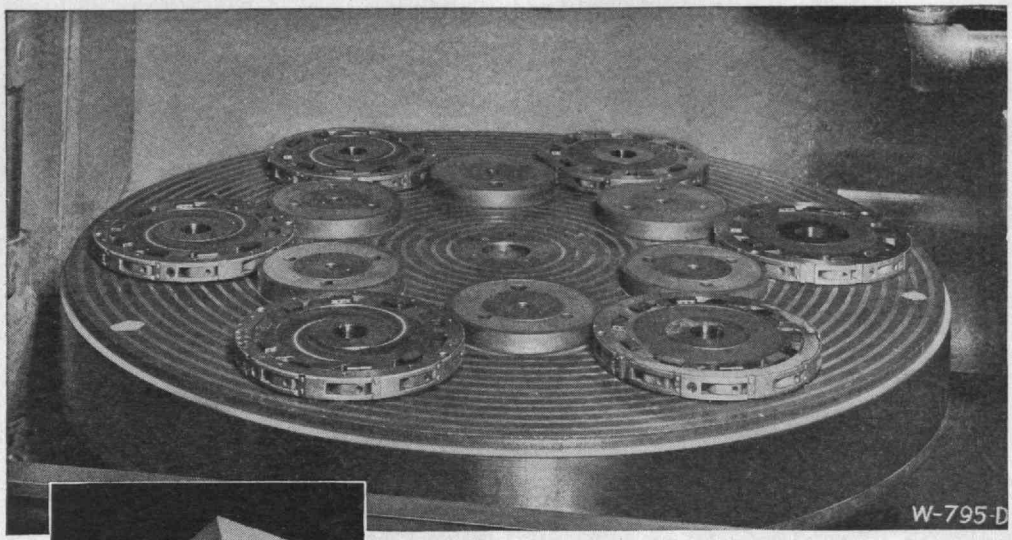
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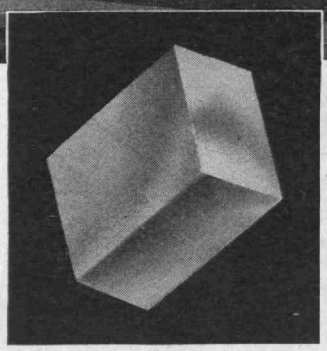
IRC makes more types of resistance units, in more shapes, for more applications than any other manufacturer in the world.





The advantages of BLANCHARD *grinding*

Production
Adaptability
Fixture Saving
Operation Saving
Material Saving
★Fine Finish
★Close Limits
★Flatness



Actual Size of Blade

★*Fine Finish* ★*Close Limits* ★*Flatness*

Grinding Hardened Steel Refrigerator Blades

These refrigerator blades are ground square to .0001″ on each end.

For the first operation the blades, held in special fixtures, rest on supporting plates. After grinding one end, the fixtures are turned over with the ground end of the blades resting directly on the magnetic chuck, thus insuring greater accuracy. The photograph shows them ready for this second operation.

Sixty blades are on the chuck at one time, .006″ of stock is removed from each end and production is at the rate of 200 pieces (400 surfaces) per hour.

The *"Put it on the Blanchard"*

BLANCHARD MACHINE COMPANY

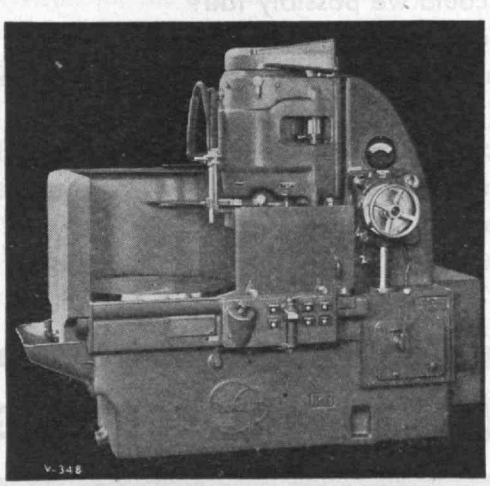
64 State St., Cambridge 39, Mass.

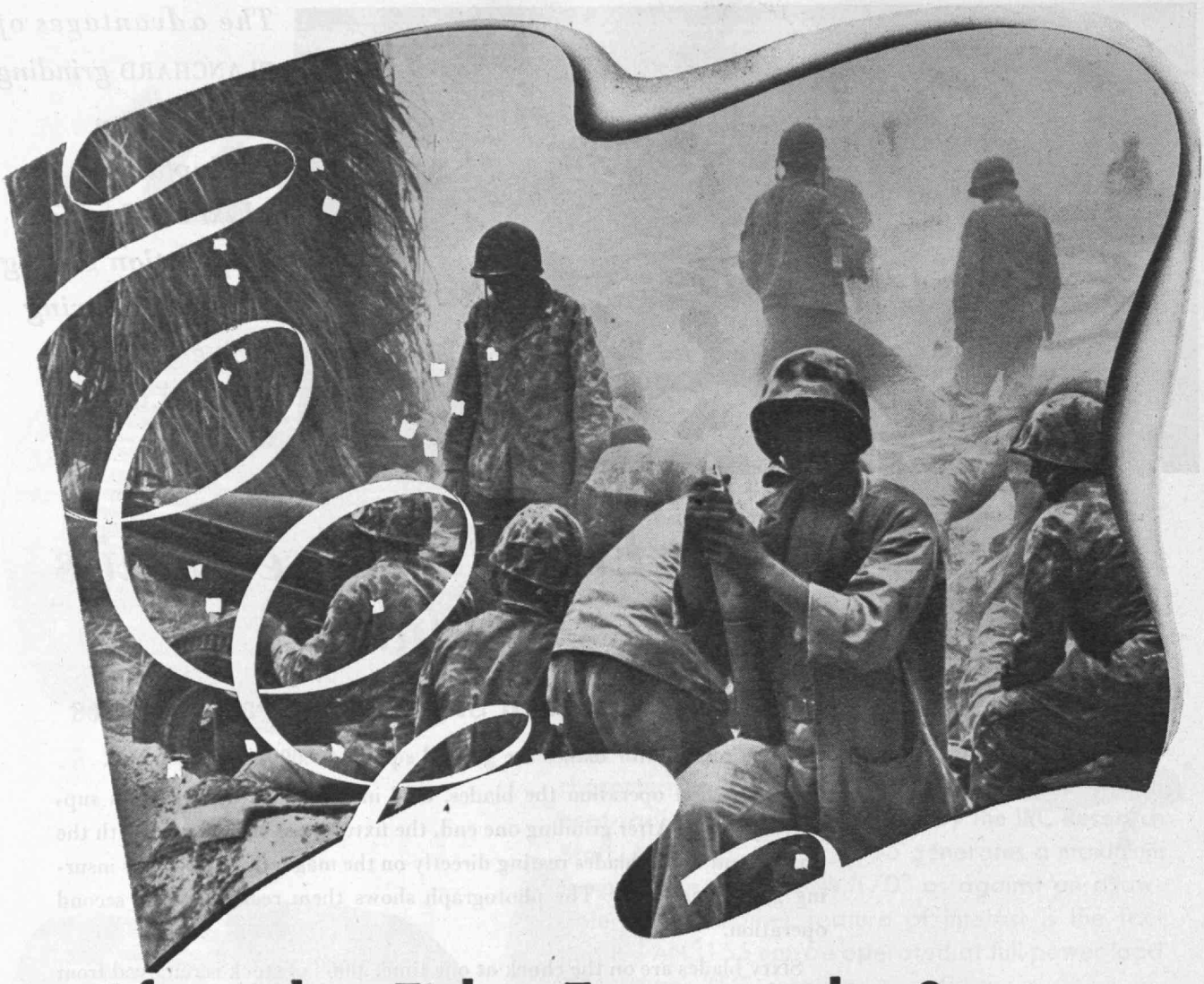
This job being done on the
No. 18 Blanchard Surface Grinder



Send for your free copy of "Work Done on the Blanchard." This book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.

BLANCHARD





After the Ticker Tape . . . what?

The whistles will blow, the bells will toll—we'll shower them with ticker tape and tears of joy—then what?

Then the victory they've won and all the things they've fought for will be in *our* hands to hold . . . We have all the weapons we could want: Productive capacity, technical skills, buying power, and need. How, then, could we possibly fail?

Only by lack of planning now for total peace.

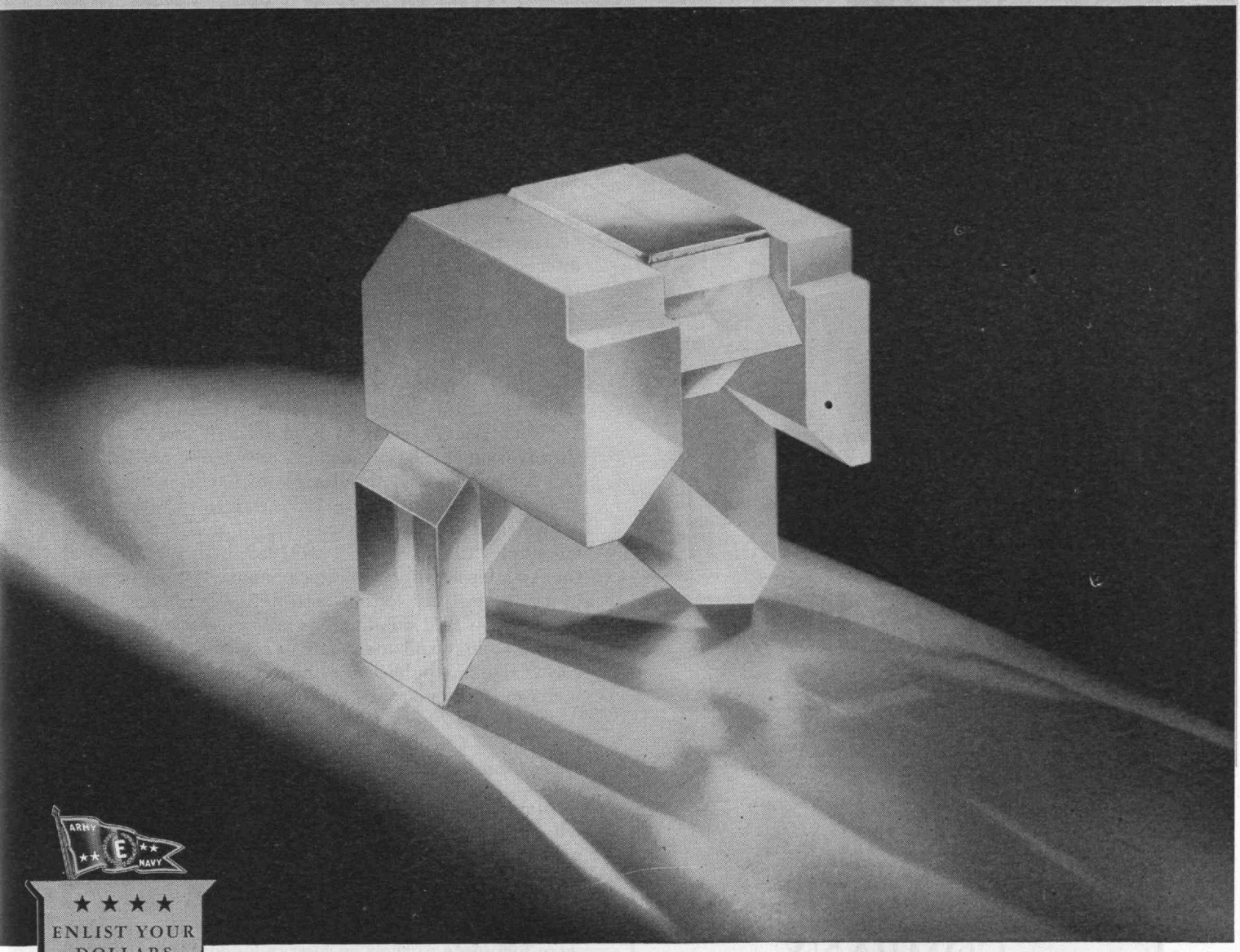
And in this critical hour of preparedness for peace, the engineers of the basic machine tool producers again have a strategic part to play.

They helped the men of government and of industry to plan the most desperate and gigantic production program of all time . . . and they can help those same men now to solve our post-war problems of reconversion.

One of these is a Bryant man. We offer his services to you.

BRYANT CHUCKING GRINDER COMPANY SPRINGFIELD VERMONT, U.S.A.

BRING YOUR OPTICAL PROBLEMS TO HEADQUARTERS. Bausch & Lomb offers: 1. America's largest precision optical facilities. 2. Ninety years of optical engineering. 3. An Optical Scientific Bureau. 4. Its own optical glass plant.



ARMY E NAVY

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To Win a Battle or Build a Better Mousetrap

Here is a rangefinder prism . . . the glass heart of one of the most precise optical instruments that the ingenuity of man has produced . . . so accurate that the angular error amounts to no more than 1 inch in 6½ miles. Created by Bausch & Lomb, every step in its manufacture has been controlled by the world's finest optical glass technicians. From the selection of the ingredients from which the optical glass is made to the final polishing the objective has been to make America's gunfire the most accurate and deadly in the world.

This is the same care and these the same skills that are also producing the fine optical instruments used in the furtherance of our war effort. Tomorrow, many of those instruments will be available to help build better lawnmowers . . . razor blades . . . automobiles . . . vacuum cleaners, etc. . . . to hasten progress in scientific research, medicine and education.

In the days of peace to come, the skilled craftsmanship that is now devoted to the production of complex rangefinder prisms will turn to the creation of even finer optical systems for the instruments used by the many branches of science, education and industry. New and improved optical methods for material control and production control . . . new fields of usefulness for instruments, ranging from research microscopes and spectrographs to hand magnifiers . . . these are our promise to the future. We suggest that you discuss your postwar optical instrument requirements with us now.

BAUSCH & LOMB

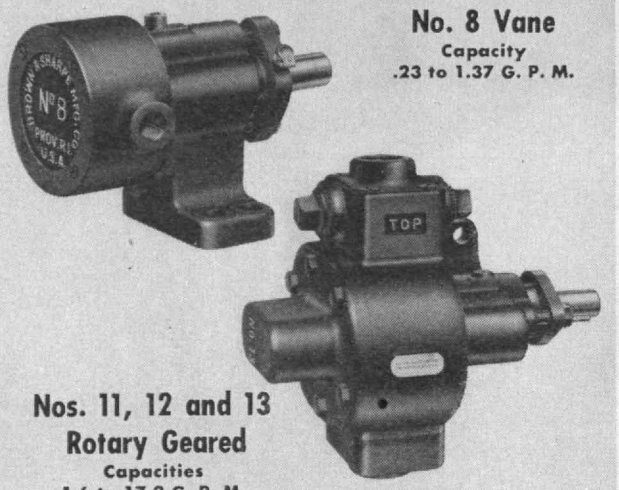
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B·S Catalog listing complete line of Brown & Sharpe Pumps including performance charts and installation diagrams sent upon request. Brown & Sharpe Mfg. Co., Providence, R. I.

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Incorporated 1885

Pressure Gages

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New York Chicago San Francisco

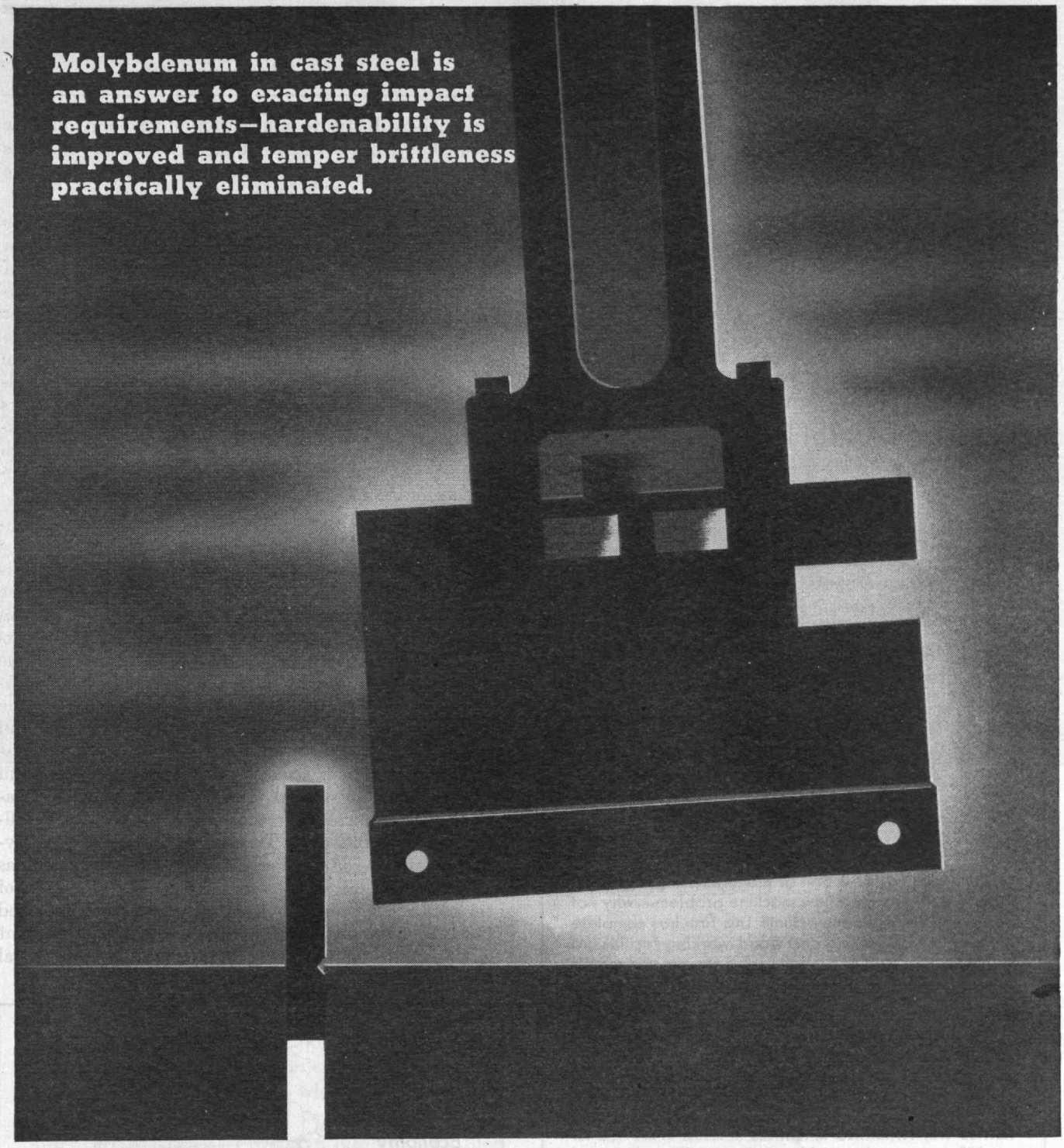
CLINTON M. HAIG '25
LUCIUS T. HILL '17 RAYMOND STEVENS '17
ALBERT C. SHERMAN, JR. '14

THE TABULAR VIEW

Skies Scanned. — Of leading rank among the sciences which World War II has stimulated and developed apace is the science of meteorology, of critical importance in aviation, in naval combat, in gunnery. A measure of the significance of techniques of war is delay of any appreciable public discussion of them — a delay which has been markedly great as regards weather watching. Much interest hence attaches to discussion (page 92) of operations by the Army Air Forces weather service during the invasion of France in July. JAMES M. AUSTIN, Associate Professor of Meteorology at the Institute, speaks with authority in describing the forecasting for the bombing of Saint-Lô; from March to September, 1944, he was on leave to the Army as a civilian consultant to the Weather Wing, serving in England and France during the invasion of the Continent. A native of New Zealand, Dr. Austin received the degrees of bachelor of arts in 1935 and master of arts in 1936 from the University of New Zealand. He was a member of the New Zealand meteorological service in 1937–1939, being stationed at the Apia Observatory, Western Samoa. After two years of graduate study at the Institute, he became a doctor of science in 1941, joining the staff as assistant professor of meteorology and advancing to associate professor last spring. He has published numerous research articles in meteorological journals, and with Bernhard Haurwitz, Associate Professor of Meteorology at the Institute, is coauthor of *Climatology*, published by the McGraw-Hill Book Company this fall.

Counsel. — The commencement speaker in wartime, whose audience necessarily consists of men going from academic halls into uniform or into industry concentrating all effort on serving uniformed forces, faces a difficult problem. The Institute's Class of 10–44, receiving degrees in October under an accelerated wartime program, were fortunate in their speaker, who could draw on experience in both these aspects of war as it enters the lives of men trained in science and engineering. BRADLEY DEWEY, a graduate of the Institute in 1909, whose commencement address appears on page 94, served as colonel and chief of the gas defense division, Chemical Warfare Service, in the first World War, receiving the Distinguished Service Medal; in the second World War, he was named deputy rubber director in the fall of 1942 and became director a year later.

Farewell. — Evaluations and appraisals of what has been done and of what opportunity has been opened for fresh achievement are a proper part of commencement seasons, whether in the customary June or in any other month which the exigencies of a warring world may dictate. It is traditional at Technology for such summations to be prominent in commencement exercises, and notably so in the valedictory address of PRESIDENT KARL T. COMPTON to the recipients of degrees. In his address this fall (page 95), Dr. Compton restates the ideals and objectives of education as the Institute expresses them. He is concerned both with aspects that change in a changing world and with a philosophy which, unchanging, gives force and direction to those (*Concluded on page 82*)



CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

ARMY E NAVY

MOLYBDIC OXIDE, BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"

Climax Molybdenum Company

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MOLY



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We knew you wouldn't let us down and we want you to know that the quality and quantity of precision work you have turned out has the sincere admiration and appreciation of those of us who have furnished the tools.

THE L. S. STARRETT CO., Athol, Massachusetts, U.S.A.

WORLD'S GREATEST TOOLMAKERS

Now, with Two Service Stars

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IF

you are looking for a firm of manufacturing engineers to work with you on a new machine problem—why not get in touch with Rodney Hunt? This firm has complete foundry, metal-working and wood-working facilities, a highly trained staff of supervising engineers and over a hundred years' experience. Rodney Hunt specialties are:

STAINLESS STEEL TANKS (patented construction gives extra strength per weight, reduces cost)

INDUSTRIAL ROLLS (wood, plastic, metal or rubber covered—special rolls of all kinds—patented head construction keeps shafts tight)

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TOPS for intelligent, prompt service.

RODNEY HUNT MACHINE COMPANY
18 Hill Street • Orange, Mass.

THE TABULAR VIEW

(*Concluded from page 80*)

adaptations. Institute affairs from other points of view as well are discussed in further condensation of his annual report to the Corporation, which appears in the "Institute Gazette" section of this Review.

Unfolding Folding. — In the second installment of his excursion into the little explored history of American patent furniture and its relation to the development of comfort in travel, SIGFRIED GIEDION treats of the evolution of the idea of the transmutability of planes — or with the unfolding of folding installations in order to improve accommodations. Dr. Giedion's discussion (page 97) affords interesting explanation of how American railroad travel came to be what it is, and in addition offers perspective on characteristics of American social thinking and inventive endeavor. The research upon which his articles are based looks toward a study of the influence of mechanization on present-day living.

Electronically Elect. — The branch of science and technology which relates to the conduction of electricity through gases or *in vacuo* — in a word, electronics — is a household familiar in the radio set and a kerbstone companion in the neon sign. Electronic transmission is an enemy of mankind in lightning, a benefactor in the x-ray. Of prime importance among the uses of science in the present war is the contribution of electronics in communications and detection devices. Development in the field has been swift and ramified; future problems and promises are numerous and great. To prepare for successful meeting of them, scientists and engineers gathered in Chicago in October and formally established the National Electronics Conference. Its work and its significance are appraised for The Review (page 90) by BEVERLY DUDLEY, '35, western editor of *Electronics*, who as secretary of the executive committee and chairman of the publications committee of the conference contributed much to making it successful, and who as able student of the social implications in addition to the professional applications of science is well qualified to assay it.

Speed with Economy



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Speed can be had with *quality* — it's all in knowing how. We've been doing it for 28 years on all types of industrial projects. Our buildings stand inspection.

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INDUSTRIAL CONSTRUCTION
Alfred T. Glassett, '20, Vice President



Life  FROM A PLASTIC BAG!

THE MAN ADRIFT here is drinking sea water. But it is sea water that he has made drinkable by chemicals and a filter contained in a VINYLITE plastic bag*. The plastic—produced by CARBIDE AND CARBON CHEMICALS CORPORATION—has been made possible by the availability of synthetic organic chemicals, in which this Unit of UCC specializes.

But the story behind VINYLITE plastics is far more than just the history of another chemical development.

Rather, this unusual substance is indicative of the way man can learn—through years of uninterrupted research in the basic and applied sciences—to make better material than nature. It is one more confirmation of the continuing progress that is achieved by co-ordinating research, development and engineering.

The importance of VINYLITE plastic in helping to solve such vital needs as fresh water at sea is typical, in terms of human progress, of the stature already attained by many of the 160 synthetic organic chemicals that CARBIDE AND CARBON CHEMICALS CORPORATION now has in commercial production.

▼

**There are good reasons why a VINYLITE plastic is used in desalting bags. It can't mildew or rust. It is strong and tough, scuff-proof and shock-proof. It is chemical-resistant and sun-resistant. It is lightweight, transparent and flexible. It is non-flammable and cleanable . . . Engineers and executives interested in this material are invited to write for the booklet P-12 "Vinylite Plastic Sheet and Sheeting."*

BUY UNITED STATES WAR BONDS AND STAMPS

UNION CARBIDE AND CARBON CORPORATION

30 East 42nd Street UCC New York 17, N.Y.

Principal Units in the United States and their Products

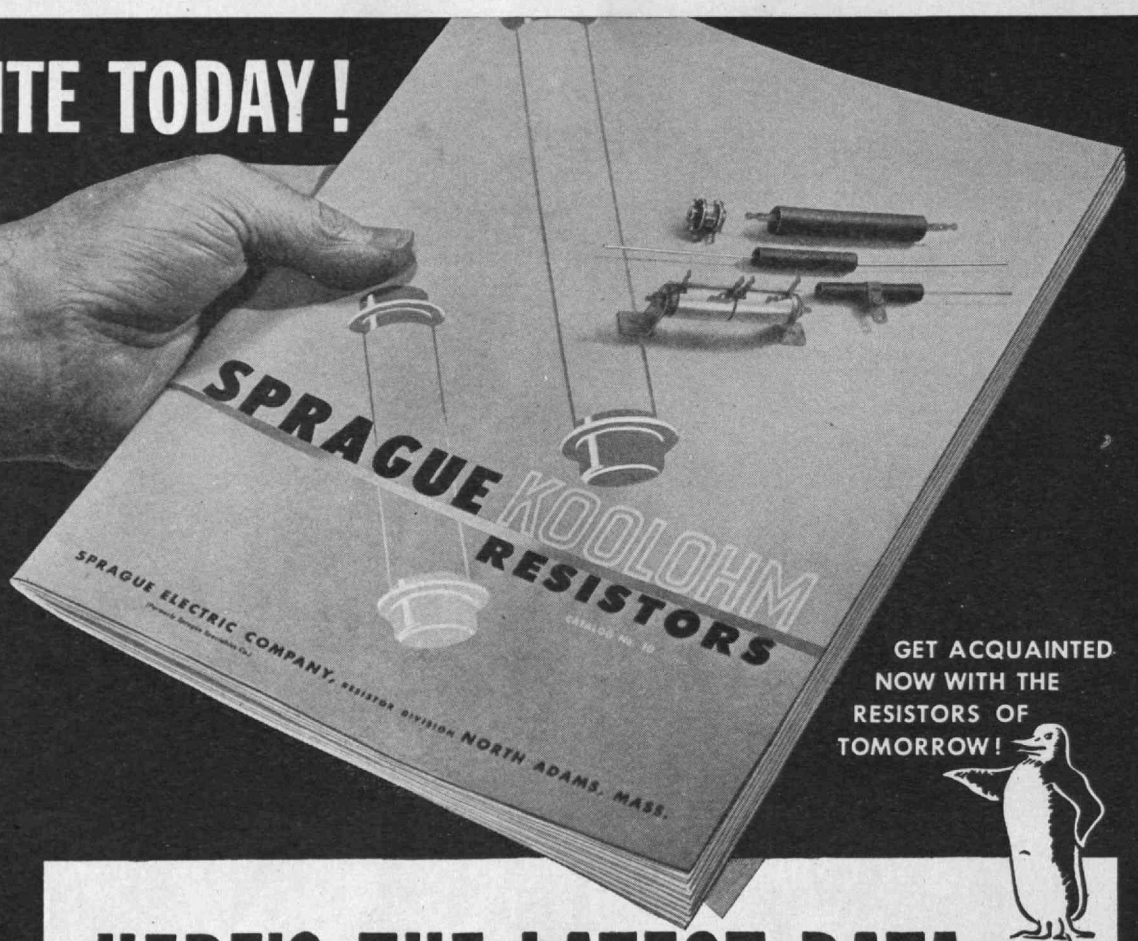
ALLOYS AND METALS—Electro Metallurgical Company, Haynes Stellite Company, United States Vanadium Corporation

CHEMICALS—Carbide and Carbon Chemicals Corporation **ELECTRODES, CARBONS & BATTERIES**—National Carbon Company, Inc.

INDUSTRIAL GASES AND CARBIDE—The Linde Air Products Company, The Oxweld Railroad Service Company, The Prest-O-Lite Company, Inc.

PLASTICS—Bakelite Corporation

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on the most up-to-the-minute resistors

Time and again, during the past seven years, Sprague Koolohms have demonstrated convincingly their ability to handle jobs that old-style, conventional wire-wound resistor types could not handle satisfactorily.

One after another, they have proved their superiority in practically every essential characteristic — from faster heat dissipation with resulting use up to full rated wattage values, to better performance under humid conditions.

Whether for war use today, or for greater efficiency for your post war product tomorrow, it should pay you to become fully acquainted with this remarkable resistor development. Write for this big new catalog today!



Resistor types in this new catalog include:

Wire-wound power types, 5- to 120-watts. Inductive and non-inductive.

Hermetically-sealed wire-wound types, 10- to 120-watts.

Wire-wound bobbin types.

Voltage divider sections, 10-, 15- and 25-watts.

Hermetically-sealed precision meter multipliers resistors.

Megomax hermetically-sealed high-voltage, high-temperature resistors.

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SPRAGUE KOOLOHM RESISTORS

T. M. REG. U. S. PAT. OFF.

The Greatest Wire-Wound Resistor Development in 20 Years

LARGEST IN THE WORLD



View at front of stoker. Coal is fed automatically onto traveling grate from large hopper above. Ash is discharged continuously at the rear.

Visualize the grate of the average house heating furnace and enlarge it in your mind to a surface 28 feet long by 24 feet wide – 672 sq ft. You will then have an accurate idea of the stoker that has more grate surface than any other stoker in the world. You could arrange all your living room furniture, including the piano, on its spacious grate and still have space to spare.

This mammoth machine, weighing 250,000 pounds, burns more coal in a single hour than a good sized home would need for an entire heating season. And it's a low priced type of anthracite that your home furnace couldn't burn – so small that all particles pass through an opening of 3/32nds of an inch. Installed in a large chemical plant, this C-E Stoker helps to produce vitally important war materials.

Combustion Engineering has designed and built many other large stokers, some almost as large as the one described here. On the other hand, there are C-E Stokers with grate surfaces as small as 7 sq ft – small enough for a large residence. Between these extremes, C-E Stokers cover every requirement with seven basic designs comprising the most extensive line of stoker equipment offered by any manufacturer. It takes experience to build such a line of stokers and C-E designs reflect over 50 years of continuous identification with the stoker business. During this half century, C-E Stokers have been applied to boilers with an aggregate capacity of more than 5,000,000 horsepower.

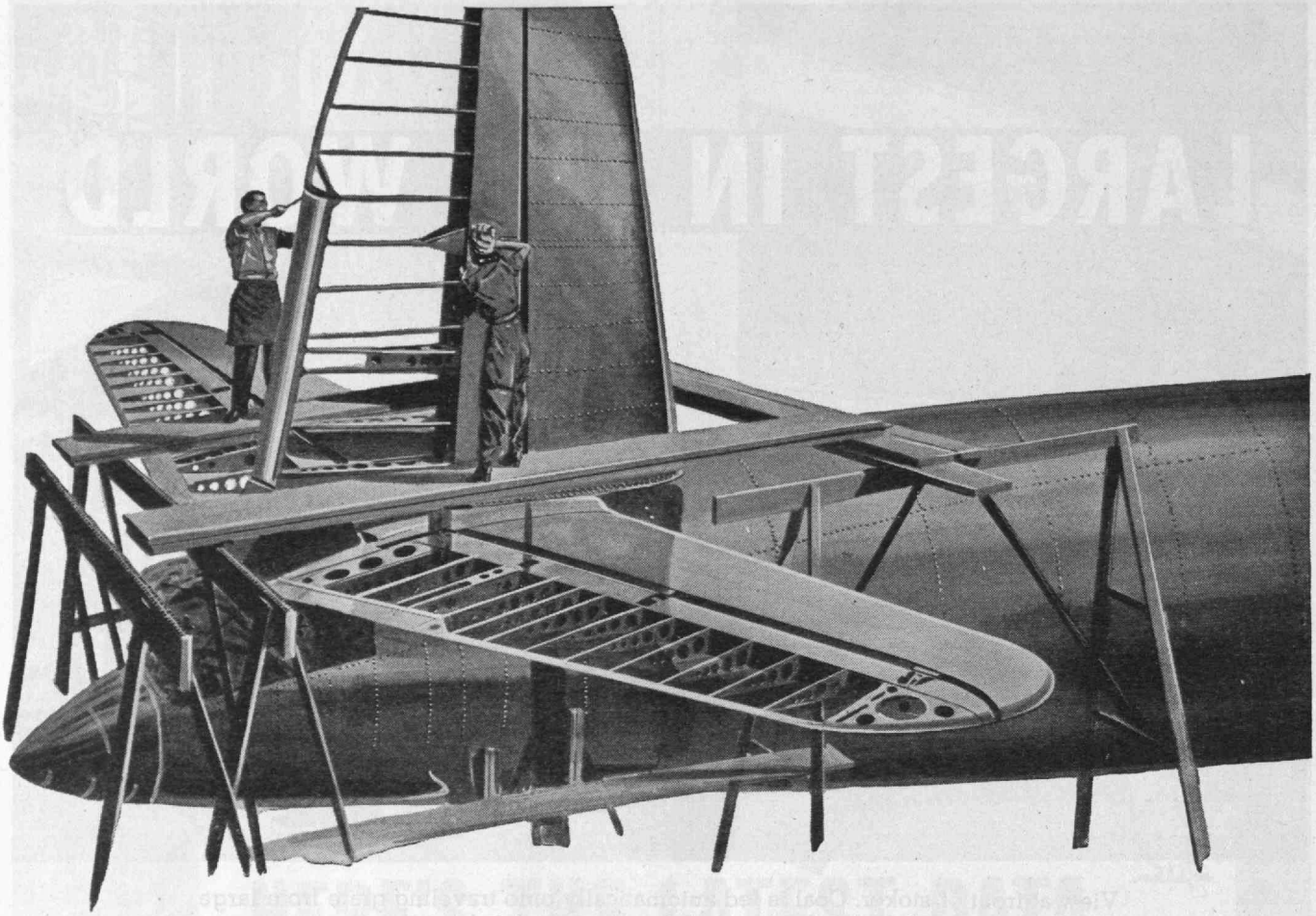
If you want top performance and economy in your next stoker installation the way to obtain them is by specifying C-E.

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C-E PRODUCTS INCLUDE ALL TYPES OF BOILERS, FURNACES, PULVERIZED FUEL SYSTEMS AND STOKERS; ALSO SUPERHEATERS, ECONOMIZERS AND AIR HEATERS



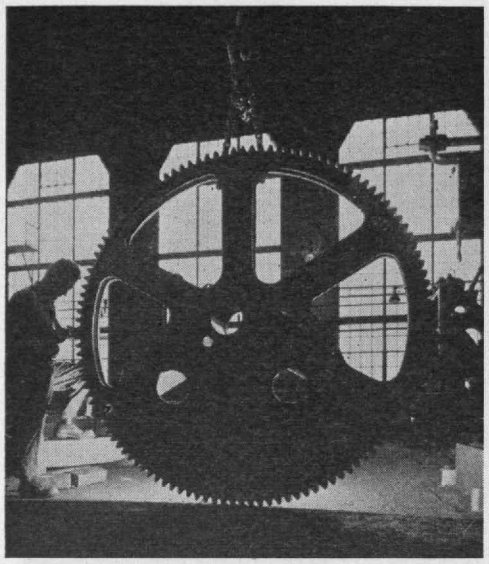
CRAFTSMEN IN AIRCRAFT PRODUCTION

WITH more than 30 years' experience in aircraft design and construction, engineers at Goodyear Aircraft Corporation have been asked to tackle some of the toughest war production assignments, including empennage and wing design and construction. That this company has succeeded in turning out components for 14 warplanes plus complete Navy airships and Corsairs speaks well for the craftsmanship of Goodyear—a great name in aircraft. Goodyear Aircraft Corporation, Akron, Ohio.

GOODYEAR
A GREAT NAME IN AIRCRAFT

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VOLUME 47 NUMBER 2



Fred G. Korth

Gear in silhouette

THE TECHNOLOGY REVIEW

TITLE REGISTERED U. S. PATENT OFFICE

EDITED

AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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Relating to the Massachusetts Institute of Technology

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C. E. Patch, '02

Answer to the lazy fisherman's prayer is this example of elementary engineering once moored in the Tiber downstream of Ponte Cestio in Rome. As the current rotated the net boom, its nets dipped and rose to dump the catch — one lone fish so far.

THE
TECHNOLOGY
REVIEW

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December, 1944

The Trend of Affairs

Hail, Columbia

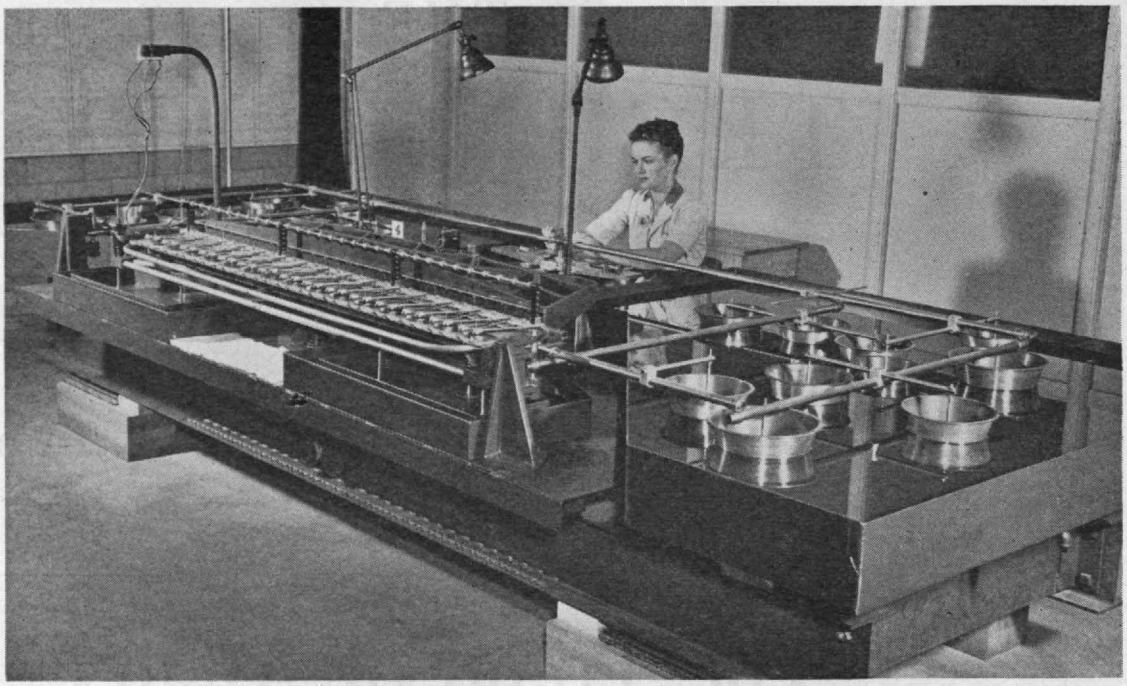
THE United States is emerging from this war with a merchant fleet about four times its pre-war size — in fact, with the largest fleet ever possessed by any nation. By the end of 1944 our shipyards will have turned out, in three years, about 4,500 cargo vessels, tugs, and barges which, with pre-war ships and those acquired from foreign sources during the conflict, will total some 50,000,000 dead-weight tons. (The dead-weight tonnage of a ship is the total weight in long tons which it may carry with safety.) Including this year's production, which has emphasized fast, efficient ships capable of holding their own in postwar competition, we will have several hundred each of big tankers, utilitarian but effective Victory ships, and the carefully designed Maritime Commission C-types, the elite of our merchant marine.

It is also expected that some 2,300 out of 2,690 Liberty ships built or scheduled will survive the war, not including about 90 ships equipped as tanks and colliers. The cost of these ships is over five billion dollars, exclusive of the shipyard facilities they required. Although the Maritime Commission has announced that tank tests show the hulls of the Liberties to be capable of speeds of 14 knots, they are now equipped with reciprocating steam engines capable of pushing them at 11 knots. Much bigger than the usual tramp, they face an uncertain future. Scrapping will return but a fraction of their cost. Laying up in fresh water will preserve them in good condition for many years, as experience with our World War I fleet proved, but conditions a generation or more later may render them obsolete.

Although prospects of useful employment are much brighter for the faster ships, certain weaknesses, at least by comparison, may still remain in the make-up of the postwar fleet. Many of the fastest and most efficient ships, particularly the various C-types, have been or will be taken over by the Navy or other services, and converted or used in such fashion that their availability for postwar trade is problematical. The proportion of refrigerated cargo ships is smaller than would be the case in peacetime construction, and some temporary shortages in that field may occur. The same holds true for ships with passenger accommodations. While the war period has seen the introduction of many devices which will increase the safety and comfort of sea travel, the needs of the ocean tourist have somehow been overlooked in the rush.

Military needs have also resulted in a fleet with an undue proportion, by peacetime standards, of large ships. Of the 5,800 cargo ships that composed the entire world merchant fleet in 1939, fewer than 650 were of more than 10,000 dead-weight tons, and 1,250 were of less than 5,000 tons. The United States, on the other hand, will end the war with more than 2,300 Liberties, which hold approximately 10,800 tons dead weight, and with about 1,000 other ships in the 7,000- to 10,000-ton class. For many coastwise and foreign routes, smaller ships are called for. In one special category, however, that of shallow-draft vessels, we are well provided.

Few indeed believe that all the ships which survive torpedoes, bombs, collisions, mines, and war's other tender mercies can be used in postwar trade. In the opinion of the Maritime Commission, a postwar fleet of 15,000,000 to 20,000,000 tons, about twice the size of our pre-war fleet, would meet the requirements of the Merchant Marine Act of 1936. This act in part specified that "the United States shall have a merchant marine sufficient to carry its own domestic water-borne commerce and a substantial portion of the water-borne export and import foreign commerce of the United States." Vice-admiral Emory S. Land, '07, chairman of the United States Maritime Commission and war shipping administrator, has broken down the commission's estimate as follows: 6,000,000 dead-weight tons for the Great Lakes and inland waterways; about 4,000,000 for coastal and intercoastal shipping; and perhaps 7,500,000 for foreign trade. In 1939, only 2,800,000 tons of our shipping were employed in foreign trade, and never since 1900 have Amer-



This mechanical fishpond is a top-flight bottleneck breaker in the manufacture of reticles, in enormous demand for gun telescopes, periscopes, and fire control instruments generally. It is a new type of high-precision pantograph for the quantity production of fine scales etched on glass. In all modern military sighting instruments, a prime essential is the tiny reference scale carried on a plane glass disk set at the focus of the objective lens system. For many years the standard practice was to make cross hairs of very fine metallic wire, animal hairs, or even the gossamer threads of spider webs. But such methods are too crude for modern war. Complicated mil scales, from which estimates of range or size of the target can be made by a simple computation and estimating procedure, cannot be constructed accurately of filaments. Such filaments, even if possible, would not stand the violent jerking occasioned by the firing of the gun carrying the telescope. The present solution is, of course, the etching of the scales on transparent reticles such as are shown on page 91 and the subsequent filling of the etched lines with black or white pigment, depending on the purpose of the instrument.

When World War II began, manufacturers made reticle scales by coating glass blanks with wax and scribing them in groups of half a dozen or so with needle styluses carried on the reducing arm of a pantograph machine. A serious obstacle to cutting miniatures of the scales and figures was the lost motion caused by friction in the bearings and supports of the pantograph arms. Even when the weight of the moving parts was supported on the best roller bearings, the resistance to movement was large enough to require enormous unit loads at the arm joints to prevent play. The result was jerky motion and unfaithful reproductions from the master plate. One of the largest manufacturers of reticles, using the most up-to-date methods known at the start of the war, could produce only 80 perfect units in a day.

The bottleneck breaker depicted above is a "jury rig" invented by the Hawk-Eye Works of Eastman Kodak, now a principal maker of reticles for American military use. It proved so successful that four have been constructed. The total output from these machines is upwards of a thousand reticles a day, with virtually no scrap. The success of the new pantograph is due to its virtually frictionless movement. Steel tubes are used for the arms extending from the operating head shown on page 91, and all working joints consist of 1/16-inch ball-and-socket bearings held together only by the weight of the arms themselves. The large item of friction inherent in supporting the moving arms is reduced practically to zero through supporting the structure at 26 key points on aluminum cake pans floating on motor oil. By this means 30 reticles can be scribed at once by a single operator with no errors at all as long as the wax is homogeneous and the needles are sharp.

An interesting feature of the scribing head, shown on the cover of this Review, is a series of 30 needle-holding heads hinged to the pantograph arm and held off the workpieces by single nichrome wires. When the operator is ready to begin cutting, she closes a switch, which passes a one-quarter ampere current through the wires, expanding them enough to lower the needles onto the work. When the cutting is finished, the current is turned off and the wires cool and contract, lifting the needles clear.

Over a million reticles have been cut on these machines so far, and no scale is too complicated to be reproduced in perfect miniature. Some of the scribed lines on the finished reticles are only 7/10,000 inch in width, while the figures are 6/1,000 inch.

ican bottoms carried more than 30 per cent of our imports and exports. To employ 7,500,000 tons in this manner without completely upsetting pre-war shipping patterns means that the United States must participate in world trade to a far greater extent than she ever has before. The determining factors in the size and activity of our merchant fleet in postwar years, therefore, will be political and economic, not technical. We have the ships or can get them quickly from our giant shipyards. If our higher standard of living raises construction costs and makes our seamen's wages higher than those of other nations, the Merchant Marine Act of 1936 has provisions for equalizing cost differentials and controlling profits — in effect a subsidy for American foreign shipping. Manning the ships already afloat are some 160,000 trained men, and behind them is the United States Merchant Marine Academy, equipped to maintain a flow of competent personnel to the fleet. We have the men, the ships, and the money. Bring on the freight.

Freedom Party

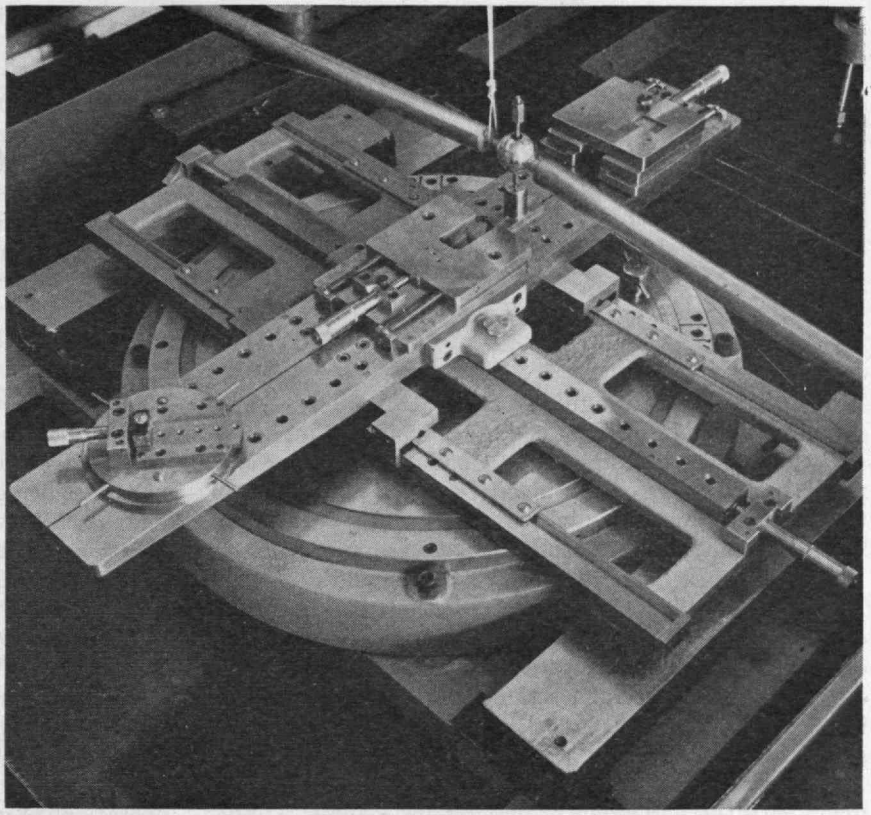
By Beverly Dudley

ENGINEERING electronics became of age this fall, the attainment of its maturity being marked by the gathering of more than 2,300 scientists and engineers in the first National Electronics Conference, held at Chicago in early October. All important phases of electronic developments were covered in the program of 50 technical papers which constituted the principal business of the meeting.

Originated as a national forum on electronic developments and their applications, the conference was established for the purpose of providing technical meetings for the presentation of original papers covering fundamental developments in electronics and applications of electronic devices; forums for the review and correlation of recent progress in the many branches of the field; symposia for

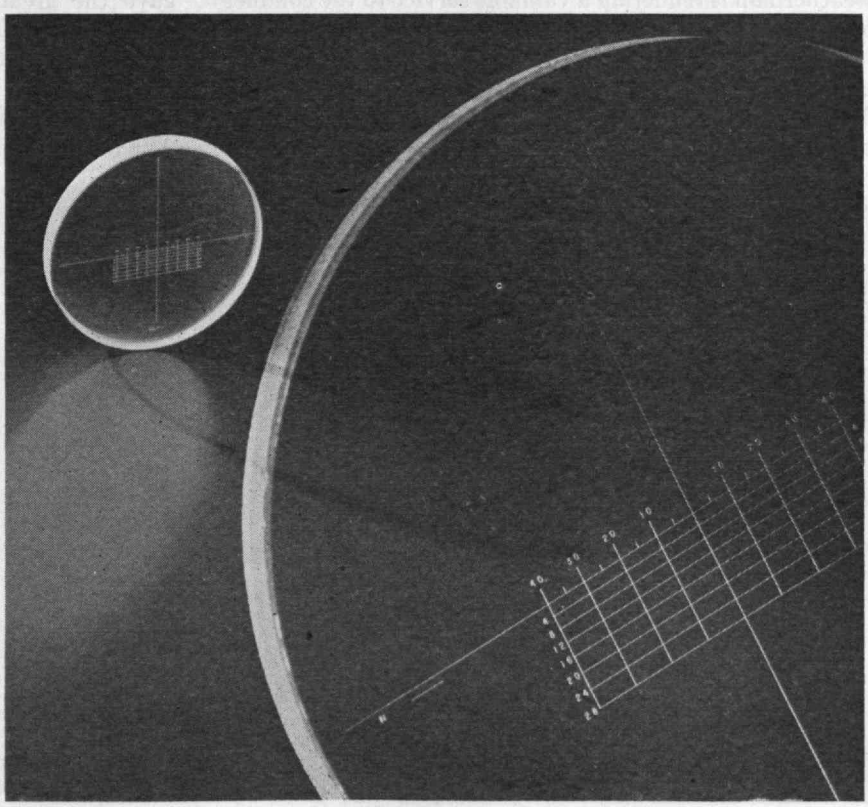
the interchange of ideas, methods of approach, and techniques of scientists, electronic engineers, medical men, and others working in different fields of application; surveys of current applications of electronics in the industrial and communications fields, pointing to future trends; and a record of current progress through the publication of the technical papers of the conference.

Since one aim of the conference was to integrate and correlate the work being done in rather divergent fields in the application of electronic principles and devices, meetings were open to all persons who could profit from the scientific and engineering spirit of the program. Heretofore there has been no single organized body which provided authoritative technical papers, discussion forums, survey symposia, and personal interchange of ideas on all branches of electronics. The large attendance, which included representatives from Canada, Mexico, England, and Argentina, thereby making the conference in fact an international gathering, gave ample evidence that the need for such services has been a genuine one. The conference was conceived in April at a meeting attended by members of technical groups which later took over its management. Chicago, whose radio and radar manufacturers have provided the Army with one-third of all its electronic and communication equipment and the Navy with half of its requirements, was a logical choice for the holding of such a conference. It became jointly sponsored by the Illinois Institute of Technology, Northwestern University, the Chicago section of the Institute of Radio Engineers, and the Chicago section of the American Institute of Electrical Engineers.



An excellent program of technical papers, in which outstanding engineers and scientists participated, covered all phases of electronic developments. The 16 technical sessions were devoted to the following topics: (1) television, (2) electronic power applications, (3) electronic aids to medical science, (4) survey of industrial electronics, (5) radio principles, (6) electronic measurements and controls, (7) recent developments in theoretical electronics, (8) electron tube development, (9) industrial electronic devices, (10) radio and telephone applications, (11) ultrahigh-frequency developments, (12) high-frequency heating, (13) industrial radiography, (14) aeronautical applications, (15) recent developments in electron theory, and (16) industrial applications of electronics. In addition to these technical sessions, educational motion pictures were shown. Together with the survey panels just enumerated, these motion pictures served to acquaint the professional engineer, who was not necessarily an expert in electronics, with the possibility of applying electronics to his industry.

It is difficult to single out any one outstanding development for special merit, particularly since the field covered was an exceedingly broad one. Mention may be made, however, of several papers which marked technical advances in their own fields. The design of optical systems which permit television images to be projected on a screen, instead of viewed on the end (*Continued on page 136*)



Forecasting for Mars

Work of Army Weathermen in the Air-Ground Operation at Saint-Lô Illustrates Developments Which the War Has Meant in Meteorology

By James M. Austin

INVASION of Festung Europa was preceded by — and in truth conditioned upon — the practice of a science which has reached high development in this war and which had its origin in war nearly a century ago. This is the science of meteorology, which was initiated in 1854 when, during the Crimean War, a severe storm in the Black Sea caused such damage to the French fleet that Emperor Napoleon III demanded that his scientists develop methods for forecasting the weather. As a result of this order, weather maps were used for the first time. Judged by modern standards these charts were very crude, but it is significant that it took a war in Europe to initiate some of the fundamental practices of weather forecasting.

During the past century considerable progress has been made with the perfection of forecast procedures. At the same time, however, there has been an ever increasing demand for more detailed and more accurate weather predictions, a demand which reached a climax with the advent of World War II. Every day hundreds of weather officers aid with the planning of bombing missions and fighter sweeps. Many more have the important task of briefing combat crews before they take off from their bases. Some weather officers are also required to furnish daily forecasts to the ground force units. Altogether the weatherman is rendering a valuable service to the conduct of many types of war operations.

All branches of the armed forces are affected, to some extent, by the weather. Consider the operation of ground forces. For one thing, they are concerned with the effect of the weather elements upon surface conditions. Heavy rains may inundate large areas or cause thick mud which prevents the passage of heavy equipment over dirt highways. This war has already furnished numerous examples of armies being stalled by General Mud. The same problem may arise with the thawing of winter snow. Moreover, the accuracy of artillery fire depends to a considerable extent upon the knowledge of atmospheric conditions. Consequently, the meteorologist is required to furnish, at frequent intervals, detailed weather information over the battle area. The choice of clothing for the soldier, the handling of perishable foodstuffs, the use of lubricants for different types of machinery — all require the advice of the weatherman. Numerous other examples could be cited where weather and climate play an important role in the operations of ground armies.

The Navy is also vitally interested in the weather: Severe storms can seriously handicap the operation of naval vessels; a heavy swell or wind waves may make beach landings impossible; low clouds handicap the enemy in detecting the approach of a task force, while clear skies favor the use of naval aircraft for patrol duty. As with ground forces, the success of naval operations is partly dependent upon an accurate forecast service.

It was the advent of a large air force, however, which gave the greatest stimulus to meteorology. Every air operation requires a very detailed forecast of the atmospheric conditions. Because of this demand, the Army Air Forces weather service expanded ninetyfold and today we find its weather forecasters in every region of the globe. As a result of the development of combined air and ground operations, the Air Forces weather officers also provide weather information for many ground force units as well. The majority of these officers have had limited experience, and the success of the weather service is a tribute to the intelligence and training of the individual forecasters. Their problems can perhaps be best illustrated by an actual air and ground operation.

During the latter half of July the American forces in Normandy were ready to attack the strong German entrenchments near Saint-Lô as an initial step in the breaking out of the beach head to which they had been confined for about six weeks. On July 25 one of the greatest fleets of United States bombers and fighters ever sent on a



Interior of a communications truck of an Army Air Forces weather station in France

single mission unleashed a terrific aerial barrage in the vicinity of Saint-Lô. At noon on the same day the Army began its drive with infantry and artillery. Progress at first was slow, but within a few days the German resistance was broken and the liberation of France was soon accomplished. The co-ordination between infantry, artillery, and air on July 25 has been described as the most precise of any American operation in this war. The weather officer contributed to this co-ordination.

Several days before the actual assault, the ground commanders announced that they were ready and that the drive would begin as soon as a few daylight hours of fine weather should occur. These few hours were necessary for a large-scale aerial bombardment. Since the target area was small and visual bombing was essential, it was important that the sky be almost cloudless below bombing level.

In the carrying out of air operations such as this, forecasts obviously are a necessity. A mission cannot be planned at short notice; operations personnel have to be notified in advance, so that the planes can be scheduled over the target shortly after the fine weather has arrived. Considerable time is required to load the planes with bombs, brief the air crews, plan fighter escort, and so forth. Furthermore, despite the urgency of a planned operation, it is not practical to have planes standing by, ready to fly off with the advent of fine weather. They may have to wait many days for the suitable weather period. Several such days of waiting occurred prior to the Saint-Lô bombing, but during that time successful missions were completed over target areas where the conditions were predicted to be favorable for bombing. Consequently, for a round-the-clock operation of aircraft, the meteorologist has to give an accurate weather prediction for at least 24 hours into the future.

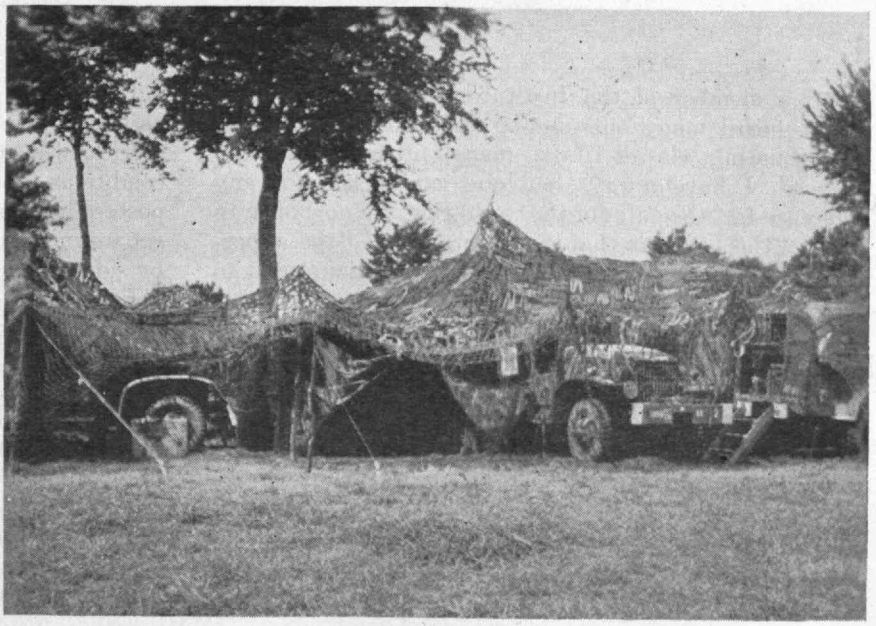
A large-scale air operation which involves fighters as well as heavy and medium bombers presents numerous forecast problems besides the weather over the target area. In the first place, operational weather must prevail over all aircraft bases; that is, the visibility and the base of the lowest cloud layer must be above certain specified minimum requirements a few hours before target time in order that all the planes can take off according to a prearranged schedule. Particularly when light or medium bombs are to be used, the thickness of the clouds must be considered. These planes have a limited gas load and cannot waste time flying around prior to becoming assembled in combat formation. When there are dense clouds over the bases, valuable gas is used in flying each plane through the cloud layer prior to assembly above the cloud top. If the clouds are too thick, this time delay in assembly means insufficient gasoline left to complete the bombing mission. Hence the meteorologist has to be sure that the bases of these fast-flying bombers will not be covered by thick clouds. It is not uncommon to find that a mission has to be canceled or postponed on account of poor weather at the base.

The weather likewise has to be favorable for formation flying throughout the entire route. Planes cannot fly in formation through clouds or in regions of excessive turbulence. The weather officer therefore has to consider the state of the weather at flight level. The use of different types of planes complicates this problem further. Whereas heavy bombers may fly at various altitudes to well above 20,000 feet, medium bombers are restricted to much lower levels. At times, the weather between the bases and target may prohibit all types of air operations.

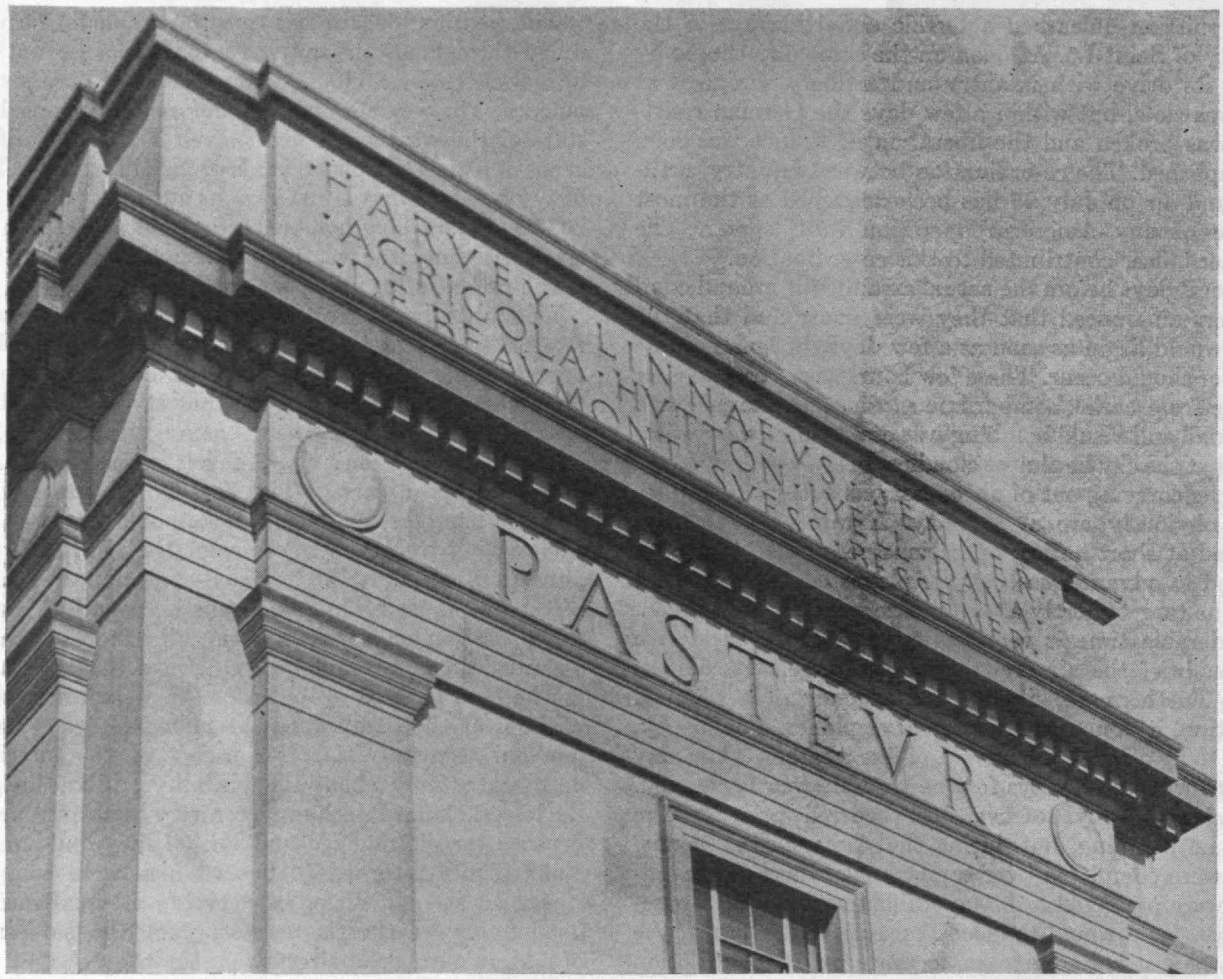
Undoubtedly the most important element of a weather forecast is the state of the sky over the target area. For an operation like the bombing of Saint-Lô, the bombardier must be able to see the target; that is, visual bombing is mandatory. In areas where enemy antiaircraft fire is intense, bombers must fly at levels which favor a minimum of flak damage. The fast-flying, maneuverable medium bombers can fly with reasonable safety at elevations which would be too low for the heavier types of aircraft. Hence, with a combined operation, at least half of the sky must be free of clouds below a level safe for the operation of Fortresses and Liberators. In heavily defended areas, this level is well above 10,000 feet.

The final forecast problem for the meteorologist is the weather at the bases when the planes return from their mission. Generally, for this aspect of the forecast he need worry only about the visibility and the height of the lowest cloud. It is, however, a very important problem because terrific damage and loss of life would result if 3,000 planes returned to bases which were completely closed on account of fog or very low cloud. Reasonably good flying weather is necessary for the safe landing of a large number of aircraft.

In order to meet the continual demands of a planning headquarters, a large weather station is essential. The personnel may include about 12 officer forecasters besides numerous enlisted men who collect and plot weather information on a series of weather maps. With the numerous forecast problems, no longer can one forecaster handle all of the details; operational forecasts are therefore the co-ordinated efforts of a group of individuals. The forecasters' tools are principally a number of different charts. One set of charts, (*Continued on page 132*)



An Army Air Forces weather station in France, its trucks covered with camouflage nets



For Scientists Peace Means New Demands

Graduates in Science and Engineering, Trained to Reason and to Understand Their Fellows, May Look Forward to Vital Tasks; Their Preparation Is Well Calculated to Meet Heavy Competition

By Bradley Dewey

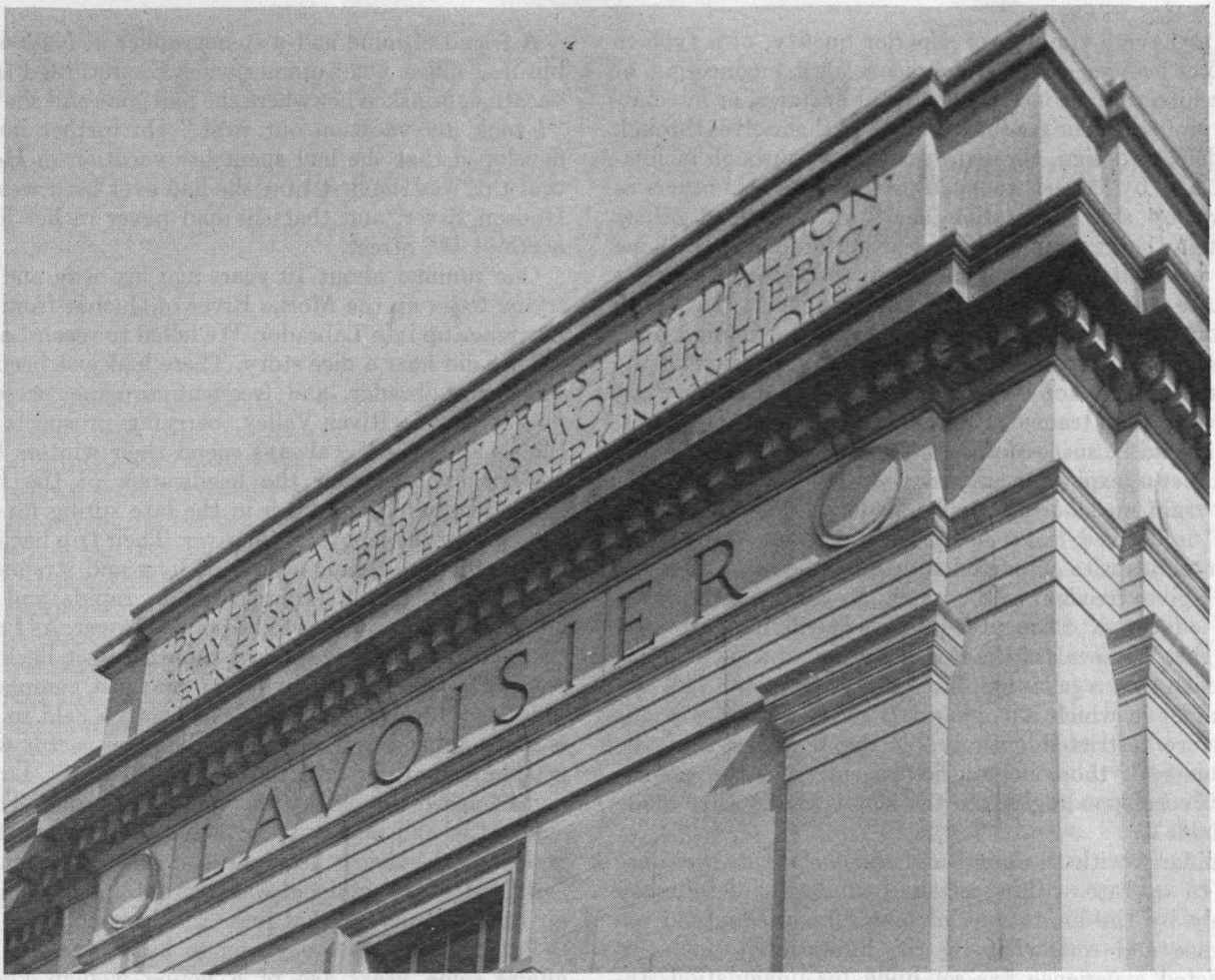
COMMENCEMENT ADDRESS

As a member of the Institute Corporation, I have heard many outstanding talks to pre-war graduating classes. Like many others who have listened, I have always had one ear cocked for any reference to "the gates of the world that are now open to you," "the horizons that are before you," "the opportunities that are opened up by your education," and so on.

I have been struck by the way in which my brilliant predecessors have avoided these platitudes. Now today, when I try my hand, I realize that I do not want to make an impersonal address but that I want to talk to you so personally that I will run the risk of skating perilously close to some of these gates and horizons. And my problem is made more difficult by a realization that I am talking to some who are going into the Army, some who are going into the Navy, and some who are going into professional life.

I propose to cure the last difficulty by being an optimist and assuming that those who are going into the armed services will soon be back to enter professional life, under conditions for which they have fought, with a priceless postgraduate experience that comes only to those who get to know their fellow man by living and fighting side by side with him for their country.

Less than 10 years ago glib-tongued, addle-headed politicians were trying to explain our economic ills by talking of technological unemployment, neglecting the obvious fact that modern technology made possible the cheap automobile, the farm tractor, modern transportation and communication, as well as the higher standard of living, shorter hours, and more free time that we now take for granted. Our own President Compton, then as now one of the great leaders of the country, was one of the few men who spoke out vociferously against this blaming of economic ills upon (*Continued on page 124*)



To Train Men Liberally to Be Leaders

Both Resources Beyond Vocational Skill and Constantly Expanding Areas of Interest and Imagination Are Essential; Individual Effort Must Continue What Formal Education Has Commenced

By Karl T. Compton

VALEDICTORY ADDRESS

IT was only a little over three years ago that I greeted you and some of your fathers or uncles at the dinner-smoker held when most of you entered the Institute as freshmen. Others of you have since joined the Class by transfer from some other institution. Still others, a considerable number, are receiving postgraduate degrees in various specialties. Thirty per cent of you are citizens of other countries with which the United States is happy to be on terms of friendly co-operation throughout this unhappy international epoch. To all of you I bring the congratulations of the Corporation, the Faculty, and the Alumni of this institution on your achievement of your degrees and, more importantly, on the opportunities ahead of you for interestingly useful careers. If you feel dismayed at the chaotic condition of the world into which you now emerge, just remember that the greater the number of problems and difficulties, the greater the need and opportunity for men of ability and training.

Three years ago I tried to suggest some "rules of the road" for the journey through the Institute toward that professional career which was your goal. I likened this journey to an automobile trip. In this analogy, the Institute combines the functions of an information center, filling station, and repair garage. The professors can supply you with directions and fuel; the infirmary can keep you in running order; but you must do your own driving. Well, you have done it; the journey is completed.

I am told that there used to be an old banner in the Tech on Boylston Street which bore the motto: "To train men liberally to be leaders." That wording interested me, especially the word "liberally." If the motto had been simply, "To train men to be leaders," that would have been a very obvious statement of a very straightforward purpose which brought you to M.I.T. and which underlies our whole program. Our educational objective is to train men (and women) in the special field of technology. We

aim to have a training of superior quality, of a type to produce leaders — leaders in science, or in engineering, or in architecture, or in teaching, or in business, or in whatever profession our graduates may find themselves through accident or design, through necessity or through inclination. And by leaders we mean persons who lead others as shown by an organization chart, or who lead others through their example of superior performance. We hope that you will *all* become leaders in the sense of superior performance in your future jobs and we expect that many of you will become leaders in the sense of holding positions of executive or administrative responsibility for the work of others. You have demonstrated your ability; you have been well trained; barring misfortune or foolishness, you should be successful.

But let us explore the meaning of that word "liberally," "To train men *liberally* to be leaders." The word "liberal" is derived from the Latin and means "free." To liberate means to give freedom. A liberal education is one which gives freedom to the mind and spirit of the person thus educated. Elementary physics will illustrate the thought: We speak of the free expansion of a gas. By this we mean that a gas is uninhibited in expanding to fill any container in which it is placed. The freedom of a gas is therefore restricted entirely by the boundaries of the container. If those boundaries be enlarged, the gas expands correspondingly into the new territory thus made available.

Similarly with the mind and spirit of man; these are free to operate within certain boundaries, determined largely by the limitations of man's knowledge and experience and somewhat by the limitations which his restricted experience has set upon his imagination. Innumerable examples could be given of ways in which man's mind and spirit are limited within the confines of his knowledge and experience. Let me suggest only a few.

A friend of mine had a stenographer in his New York business office. One summer when she returned from her vacation, he asked her where she had gone and she replied, "I took my vacation out west." On further inquiry it developed that she had spent her vacation in Hoboken, that this was the first time she had ever been west of the Hudson River, and that she had never in her life been north of 42d Street.

One summer about 10 years ago my wife and I were trying to go up the Moisie River of Quebec from the St. Lawrence up into Labrador. We failed to reach Labrador, but we did hear a nice story. There had just been a gold strike in Labrador, and frequent airplanes were flying up the Moisie River Valley, carrying prospectors. The Moisie Indian tribe always spend their winters hunting and trapping around the headwaters of the river in Labrador, but come down in the late spring for salmon fishing near the mouth of the river. Their trip back up the river, after the fishing season, is long and strenuous, for the currents are swift, there are many rapids, and there is one mountain which has to be portaged over. As I recall it, the Indians take more than a month to get back up the river. The chief of this tribe, having just completed the arduous return journey, came out onto a field to see one of these prospectors' airplanes. The prospector was just getting ready to fly back to the banks of the St. Lawrence, and he asked the chief if he would like a ride. The chief climbed in and in about two hours found himself at the mouth of the river whence he had departed some weeks earlier. His only comment was to grunt and to point at the airplane and say, "What price that canoe?"

Perhaps you are too young to have read of the love affairs some years ago of a young woman known as Peaches Browning, who had married a sugar daddy. At about that time a decidedly unliterary individual was given a copy of Browning's (*Continued on page 112*)



Railroad Comfort and Patent Furniture

The Concept of Luxury in Travel, George M. Pullman's Contribution, Meant a Change in American Ways

By Sigfried Giedion

II

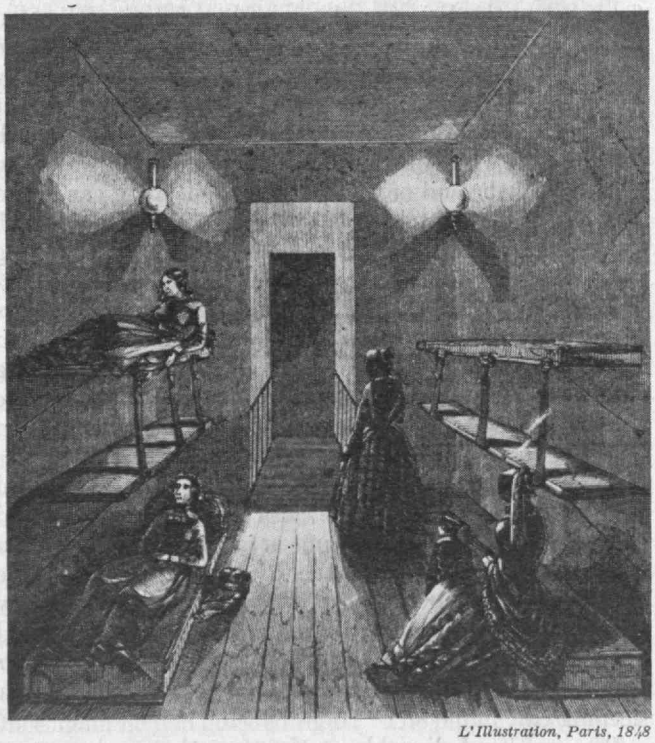
THE creation of the sleeping car as we know it today followed soon after construction of the reversible and adjustable railroad seat was attempted. The first American patent is usually taken to be one issued in 1854. This patent did not yet speak, as later ones were to, of a sleeping car. Its aim was to convert a seat into a couch; it belonged among the many experiments in the same direction.

On the threshold of the great railroad panic in 1873, a record trackage was built: almost 7,500 miles in 1871, or more than the total construction of the first 20 years. Closely connected with this expansion was the rise of the luxury car in its various types. But — it should always be stressed — a demand for heightened comfort in American travel was already finding its response at a time when train runs on European and American lines were quite comparable in length. The luxury types were in use on the regular routes several years before the transcontinental lines were opened. In 1869 the Union Pacific, building from the East, made junction with the Central Pacific, building from San Francisco. And in 1870, when George M. Pullman invited the Boston Board of Trade on the first through journey across the continent, made in seven days, he had only to pool the cars in his depots.

The luxury types entered service in this sequence: 1865, the palace sleeping car *Pioneer;* 1867–1868, hotel car and dining car;[1,*] 1867, drawing-room car of Webster Wagner, Pullman's competitor, who succeeded in running his cars on the Vanderbilt lines, where they continued in operation until after Pullman's death in 1897; 1875, Pullman's drawing-room car, at first called "reclining-chair car" after its type of adjustable armchair and later called "parlor car." It has run since this date.

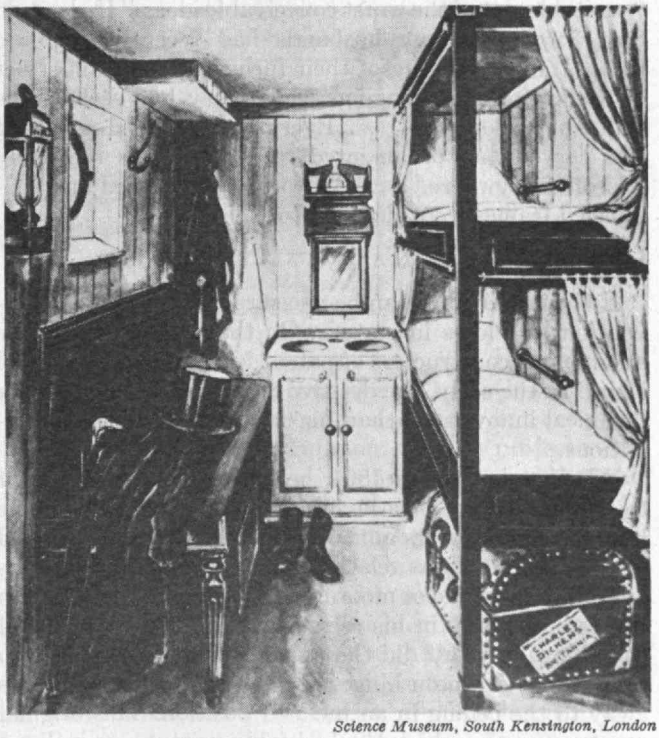
In short, today's types were established by the end of the Sixties. In 1886, nearly 20 years later, came the vestibule, by which the entire train was brought under one roof like the different rooms of a house. From the technical angle this important safety device, continually improved, is perhaps the most original contrivance to have left Pullman's workshop. No other fitting found such rapid and enthusiastic acceptance.[2] Here as in many other

* Footnote references begin on page 103.



L'Illustration, Paris, 1848

Fig. 1. Primitiveness of the sleeping car in the Forties: a "sleeping car" for ladies on the Baltimore and Ohio Railroad, 1847. "They are divided," observed a French traveler, writing in L'Illustration *in 1848, "into several apartments or sleeping rooms each holding six beds or rather couches placed in three tiers along the sides. Three perpendicular straps guarantee the sleepers from falling. . . . These six-bedded rooms are all connected."*



Science Museum, South Kensington, London

Fig. 2. Primitiveness of the steamship cabin in the Forties: Charles Dickens' "stateroom," S. S. Britannia, *1842. Even on the ocean liners of the Forties comfort was very primitive. Humorously, Dickens complained: ". . . A very flat quilt, covering a very thin mattress, spread like a surgical plaster on a most inaccessible shelf. . . . And I sat down upon a kind of horsehair slab, or perch, of which there were two. . . ."* (American Notes, *chap. i.*)

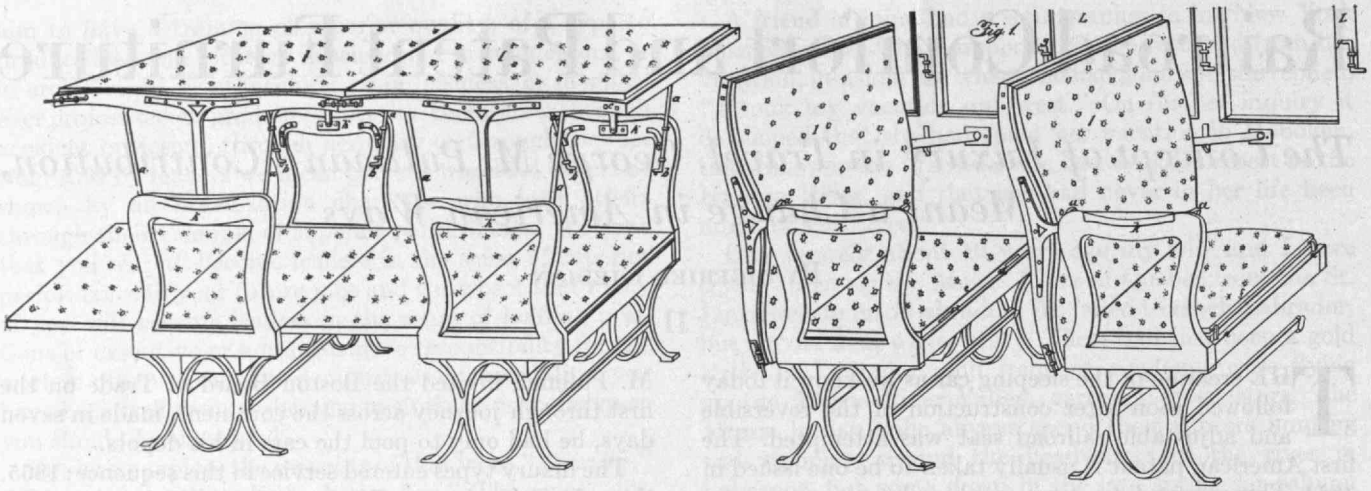


Fig. 3. "Car seat and couch," regarded as the first American patent for sleeping cars, 1854. The inventor obtained horizontal sleeping surfaces by folding over the seats and the seat backs. The sleeping car evolved from the reversible seat. The early inventors did not speak of the "sleeping car," but, like the contemporary patents for railway seats, they spoke of "couches" or "seat improvements." There being no sharply defined transitions, there is some arbitrariness in selecting this solution of 1854 as "the first" sleeping-car patent.

spheres, the future development had already taken shape in its basic features by 1890. The sleeping car that Pullman exhibited at the Chicago world's fair of 1893 and reproduced in a great colored folder[3] established a standard that endured for decades.

This is the period when the patent-furniture movement neared its end. Like the fashionable interiors of the period, the sleeping cars and the dining cars succumbed in the Nineties to superficial luxury. They were overfestooned with rococo ornamentation, and their high curved ceiling — known as "full empire" — masqueraded as a stone vault. In one of his articles, Edward Bok, editor of the *Ladies' Home Journal*, sharply attacked this "veritable riot of the worst conceivable ideas." He learned that "women whose husbands had recently acquired means" were ordering of their furnishers "certain styles of decoration and hangings which they had seen in the Pullman parlor-cars. . . . Every foot of wood-panelling was carved and ornamented . . . ; gilt was recklessly laid on everywhere. . . . Mirrors with bronzed and red-plushed frames were the order of the day."[4]

George M. Pullman and Luxury in Travel

If George M. Pullman be measured by his technical inventions, he loses in stature. On that score, any of the anonymous constructers of patent furniture can lay equal claim. In the early, the decisive days he was less keen for technical innovations than for the use of them in combinations.

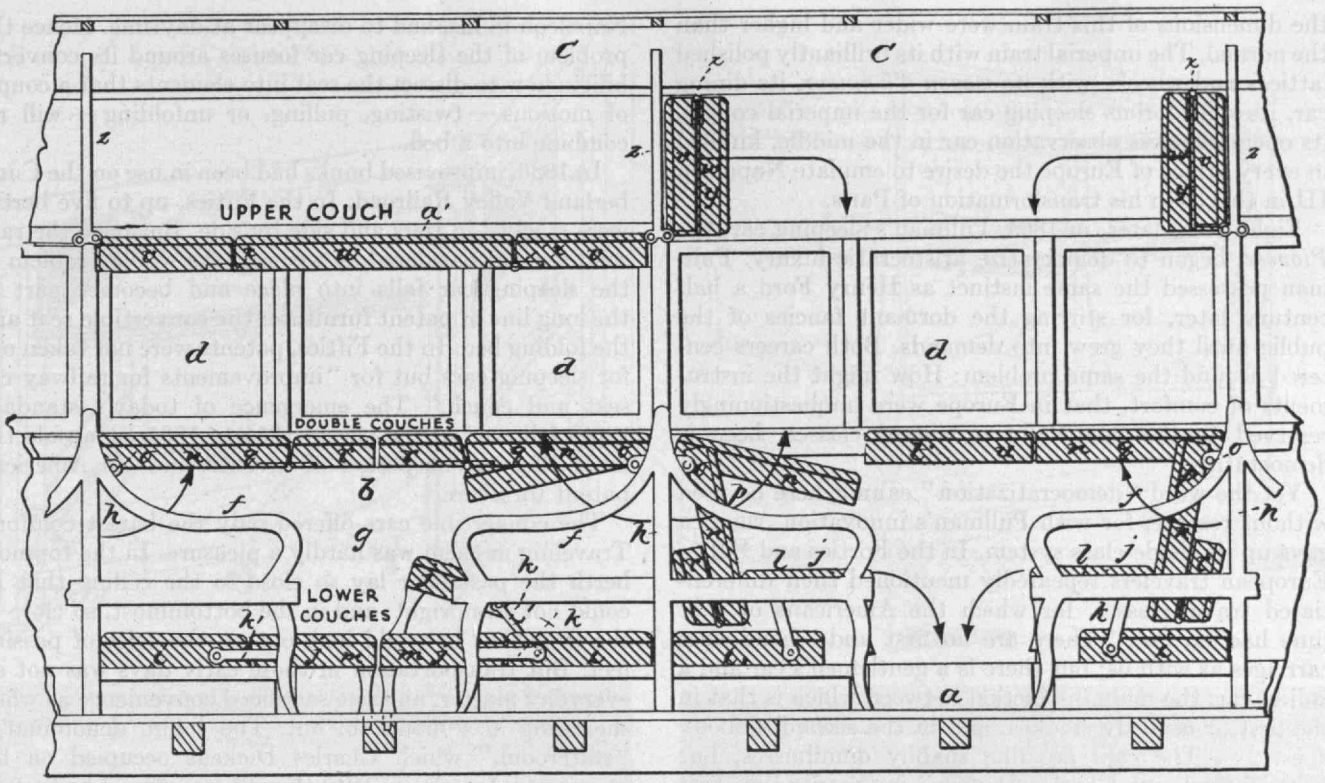
When at length, in 1864, he entered his first patent together with another inventor, he was following some hundred predecessors in the field of the sleeping car. And even this patent was relatively old fashioned; it still followed the principle of mooring the upper berth flush with the ceiling.[5] Only in his second patent, of September in the following year,[6] did the upper berth appear as a flap that swings down on hinges above the window and folds away to the ceiling in an inclined position. This original construction, in which the bed folds away to an inclined position, he derived from one of his predecessors. He adopted it in his famous *Pioneer* of 1865, and it has remained standard in America to this day. We shall return to it in discussing the convertibility of sleeping-car furniture.

Pullman's strength, then, was not in mechanical devices: Here he availed himself of anything appropriate to his purposes. Pullman's strength lay in quite another sphere, not the technical but the sociological. His invention was luxury in travel. This was his domain. Here he showed his creative capacity, outstripping all others in foresight, strategy, and boldness. Here he was able to work out and enlarge his idea to the utmost. Here he gained overwhelming and lasting success.

George Mortimer Pullman (1831–1897) began as a joiner in his brother's business. He was not a wagonmaker by trade as were his two most important competitors.[7] Organization, enterprise, rather than joinery, was his field. When the Erie Canal was widened, he transported houses from the old bank to the new, and when Chicago began to raise its houses several feet above the swampy ground, he found a similar outlet for his talent. His feat there, it seems, was, in 1855, raising a hotel bodily with its sidewalk while custom continued. Pullman was then 24. Toward the end of the Fifties, the sleeping car began to arouse general interest; in 1857, Theodore T. Woodruff, the leader in this field of invention, built his new sleeping cars and started them in operation. In 1858, Pullman purchased two old cars which he remodeled as sleeping cars for $1,000 apiece. Then the Civil War broke out. Pullman removed to Colorado and temporarily turned to mining enterprise. By furnishing materials to the mines he realized $20,000 and returned to Chicago; he was 34 when he carried off the great coup.

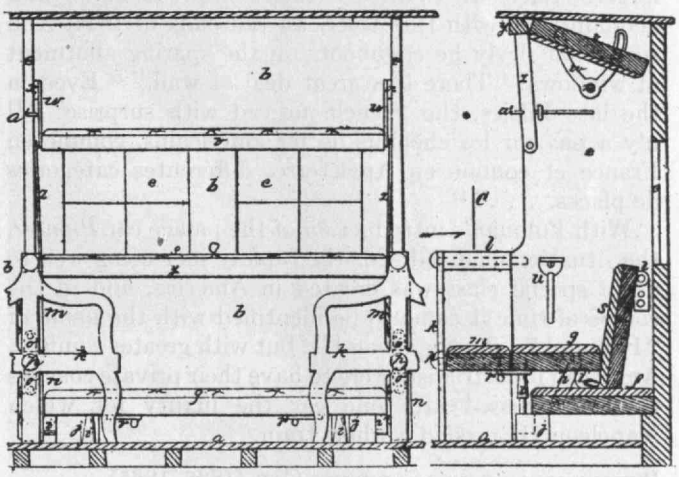
The Sixties, on the European as well as on the American Continent, fostered a middle class growing in wealth and numbers. In Europe at this time arose the luxury hotels on the Lake of Lucerne and the Riviera; in America, the luxury sleeping car. Pullman's strength lay in his early recognition of this swelling demand for luxury. He staked his $20,000 on one card and in 1865 built the *Pioneer* (Figs. 13 and 14) at four times the cost of any other sleeping car.

It seemed unbelievable at the time that so heavy an investment would ever yield a return. Besides, Pullman's sleeping car could not be used in normal traffic as it was too wide for the bridges and fouled the platform roofs. However, things happened as Pullman foresaw: The bridges were widened, and the platform roofs were



BASIC SOLUTION FOR THE UPPER BERTH

Fig. 4 (above): *Woodruff's "seat and couch for railway cars," United States Patent 16,159, December 2, 1856. Fig. 5* (at right): *Woodruff's "improvement in railroad-car seats and couches," United States Patent 16,160, December 2, 1856. Second of the basic patents, that of Theodore T. Woodruff, the most fertile inventor in the field, offered the principle that has not been abandoned in America. Anyone curious for the details may peruse Woodruff's lucid specifications. Our own curiosity tends in another direction: classification according to methods. The solution basic to patent furniture consists in extending the law of the transmutability of planes. For the wagon builder of Woodruff's type, furniture resolves into a system of movable planes. Seats, seat backs, wall surfaces — all is articulated, nothing is "hard and fast." Like his predecessors, Woodruff folds the seat bottoms down to floor level, the seat backs upward to the horizontal. The topmost bed — the fifth — involves the decisive solution: When not in use, it swings up to bridge the angle of roof and wall. This is the idea that Pullman took over for his famous* Pioneer *of 1865 (cf. Fig. 13). Woodruff submitted both his patents on the same day, December 2, 1856. The difference is that the first (Patent 16,159) dissects the upper bed into four parts articulated in pairs, whilst the second (Patent 16,160) swings up the entire bed into the vacant space between the window and the roof, in the inclined position still preserved today.*



adjusted to the size of car which he believed necessary for comfort, and which has remained unaltered to this day. He was one of the first entrepreneurs to master the effective use of publicity. Just as in 1870 he was to invite American industrialists on his first continental crossing, he found in the unusual events of 1865 a means of bringing celebrity to the *Pioneer* and of getting the platforms cut down to admit his cars. The luxury sleeping car *Pioneer* made its first journey as a hearse. It carried the body of Abraham Lincoln to its resting place in his home town.

Pullman found no trouble persuading the public to pay $2.00 for a night's journey, instead of the former $1.50. Once again he had guessed right. "The public flocked into the Pullmans and the old cheaper cars were taken off." [8] The other companies had to fall in line. The *Pioneer* afforded the comfort of a good hotel. It had interior appointments of "black walnut woodwork" and "richest Brussels carpeting." Every detail was the object of careful thought. Instead of plain candlelight, "several beautiful chandeliers" hung from the ceiling, and "French plate mirrors [were] suspended from the walls" [9] (Fig. 13).

Luxurious travel in Europe was for none but the most elect. It may well be that Pullman, when he projected his first palace car, had in mind the imperial trains that the French railroad companies presented to Napoleon III (Figs. 10 and 12). Pullman, who kept a watchful eye wherever novelty was stirring in his sphere, certainly did not overlook the "train impérial" with which the Compagnie de Chemin de Fer de Paris à Orléans honored Napoleon III in 1857. A widely circulated and impressive publication,[10] in details running to color reproduction, acquainted the world with this masterpiece of French taste and French construction. Camille Polonceau, the great engineer — still remembered for the iron roof construction which bears his name — constructed the train, connecting the cars by deftly contrived platforms. Viollet-le-Duc designed the interior with its studied ceiling decorations, its heavy hangings and carpets. As with Pullman's *Pioneer*,

the dimensions of this train were wider and higher than the normal. The imperial train with its brilliantly polished lattices and wheels, with its *wagon d'honneur*, its dining car, its splendorous sleeping car for the imperial couple, its open, glassless observation car in the middle, kindled in every prince of Europe the desire to emulate Napoleon III in this as in his transformation of Paris.

Eight years later, in 1865, Pullman's sleeping car, the *Pioneer*, began to democratize aristocratic luxury. Pullman possessed the same instinct as Henry Ford a half century later, for stirring the dormant fancies of the public until they grew into demands. Both careers centered around the same problem: How might the instruments of comfort, that in Europe were unquestioningly reserved to the financially privileged classes, become democratized?

Yet the word "democratization" cannot here be used without reserve, for with Pullman's innovation America gave up its single-class system. In the Forties and Fifties European travelers repeatedly mentioned their differentiated travel classes, for which the Americans of that time had no use. "There are no first and second-class carriages as with us; but there is a gentlemen's car and a ladies' car: the main distinction between which is that in the first, everybody smokes; and in the second, nobody does. . . . The cars are like shabby omnibusses, but larger." Such are Charles Dickens' impressions on first acquaintance with the American railroads in 1842. And somewhat dryly he comments on the sparing allotment of windows: "There is a great deal of wall." [11] Even in the late Fifties, the French noticed with surprise: "Il n'y a pas sur les chemins de fer américains, comme en France et comme en Angleterre, différentes catégories de places. . . ." [12]

With Pullman's introduction of the palace car *Pioneer*, the situation changed. For the rapidly increasing well to do, a special class was created in America, and in the course of time it came to be identified with the name of "Pullman." Like Napoleon III, but with greater comfort, American industrialists were to have their private coaches that compressed into one car the luxury for which Napoleon III needed a whole train.

Precursors of the Sleeping Car (1836–1865)

The problem of the sleeping car is foreshadowed in the ship's cabin. As conveyances, both ship and train command a very restricted space. Yet railroad cars must be even more parsimonious with their space than must the larger ships. This immediately poses the problem overshadowing all others: economy of space, how to secure adequate comfort for the traveler without pre-empting extra space.

It is not possible to construct for everyone an apartment like that of Napoleon III. It is not possible to put on wheels a bedroom with fixed beds, a reception room, a dining room, and an open veranda. Nevertheless, in America from 1865 to the year of the first vestibule train — 1886 — the train became more and more a traveling hotel. Only one item of the imperial train had to be foregone: the bedroom with fixed beds.

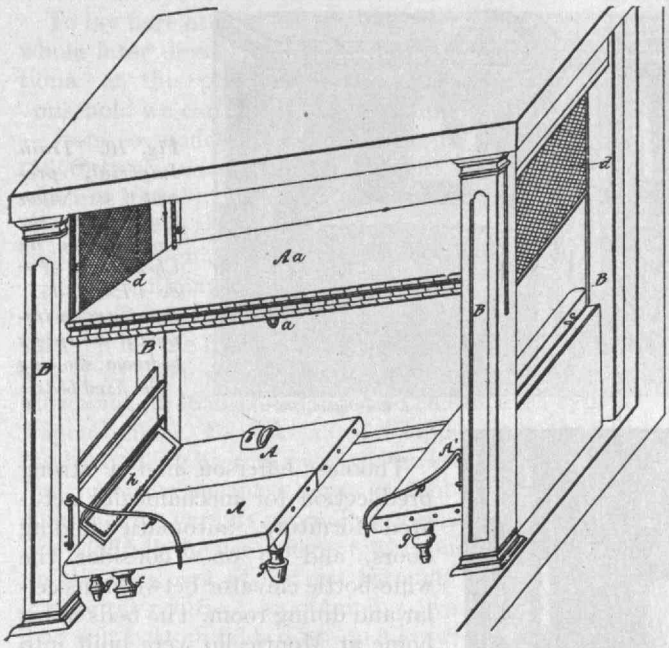
A car now had several functions to fulfill: It must be convertible — living quarters by day and sleeping quarters by night. Even the dining cars at first turned into sleeping cars at night, being called "hotel cars." The beds, in which the travelers enjoyed as much comfort as Napoleon in his, had to disappear at daytime. Hence the problem of the sleeping car focuses around its convertibility: how to dissect the seat into elements that a couple of motions — twisting, pulling, or unfolding — will recombine into a bed.

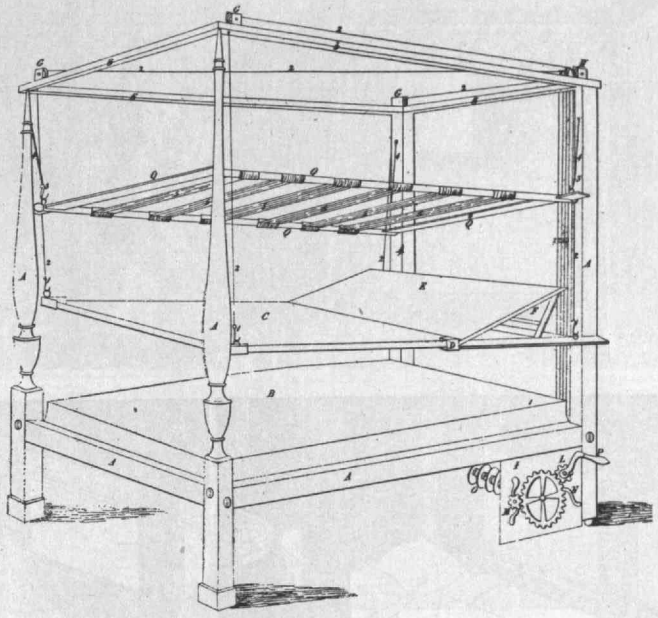
In 1836, improvised bunks had been in use on the Cumberland Valley Railroad. In the Fifties, up to five berths were stacked in tiers and side by side. But once the railroad seat is considered as a couch, the whole problem of the sleeping car falls into place and becomes part of the long line of patent furniture: the convertible seat and the folding bed. In the Fifties, patents were not taken out for sleeping cars but for "improvements for railway car seat and couch." The emergence of today's standard types followed in the period 1854 to 1865, alongside the most effervescent period of inventiveness in American patent furniture.

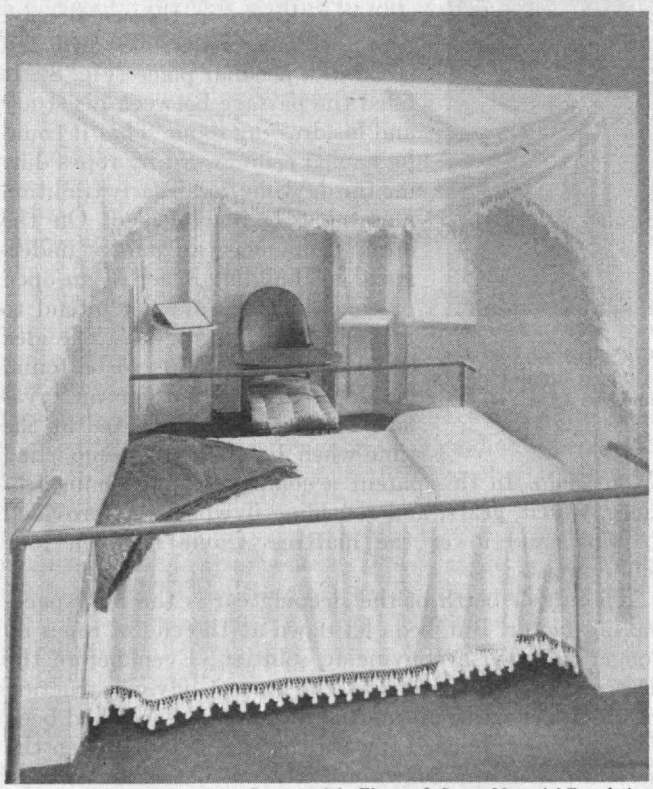
The convertible cars offered only the barest comfort. Traveling in them was hardly a pleasure. In the topmost berth the passenger lay so close to the ceiling that he could not sit upright; and in the bottommost, so close to the floor that he could look out on the soles of passing feet. But transportation in those early days was not an everyday matter, and one sacrificed convenience as when sheltering in a mountain hut. The cabin, denominated "stateroom," which Charles Dickens occupied on his crossing to America in 1842 (Fig. 2) was almost as austere as the American sleeping car of 1847 [13] (Fig. 1). This sleeping car of the Baltimore and Ohio, with its lath frame that folded to the wall at daytime, might do, but only as a makeshift. "To tell you that these beds are perfectly comfortable would be a lie, but one is thankful to find them such as they are and to be able to pass a pretty tolerable night." [13]

This sleeping car of 1847 had close ties with the sleeping accommodations on American canal boats of the time. Nathaniel Hawthorne suggests with the grace of his language what life was like in a canal boat's cabin — living quarters, dining room, and dormitory in one. "The crimson curtain being let down between the ladies and gentlemen," — as he calls it, "the sexual division of the boat" — "the cabin became a bedchamber for twenty persons, who were laid on shelves one above another. . . . Forgetting that my berth was hardly so wide as a coffin, I turned suddenly over, and fell like an avalanche on the floor. . . ." [14]

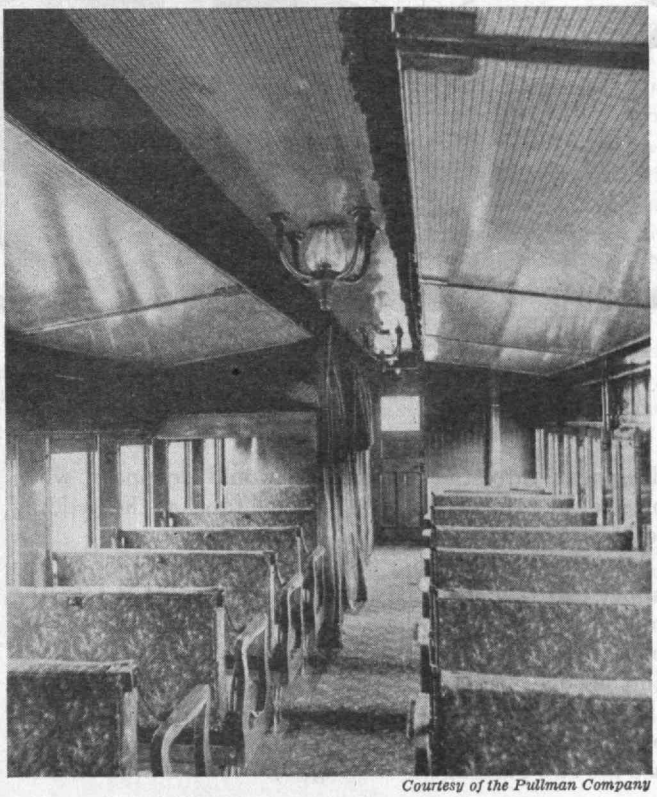
In 1854, three years after the appearance of the convertible railroad seat, the United States Patent Office granted the first American sleeping-car patent [15] (Fig. 3). An English patent (1852) [16] mentioned in the literature of the subject has nothing to do with the sleeping car. It attempted — in scarcely satisfactory fashion — to double the seating capacity of the car at the expense of headroom: a double-decker. A glance at the sketch made by the Buffalo inventor of 1854 shows that he took the reversible seat as his point of departure. Instead of swinging the back rest through the customary 180 degrees, he swung it only through 90 degrees, up to a horizontal position in midair, where it was made fast. He carried his back rests higher than the usual, "so arranging the backs of contiguous seats that they may meet and remain in the same horizontal plane." A second bed was formed from the seats proper; in the words of the inventor, "I open and extend these cushions of the seats, . . . which are upholstered on two sides, and fitted







Courtesy of the Thomas Jefferson Memorial Foundation



Courtesy of the Pullman Company

HOISTING BEDS BY ROPE AND PULLEY

Fig. 6 (upper left). *An "improvement in railroad car seats," 1858. "The upper bed . . . is neatly . . . fitted into the roof of the car, and when out of use is drawn up into its place. . . . The bed is easily drawn down to the stops by the loop, with pillow and blanket upon it, ready for use for two passengers." The principle of this patent as well as Woodruff's patent of two years before was foreshadowed in the Eighteenth Century.*

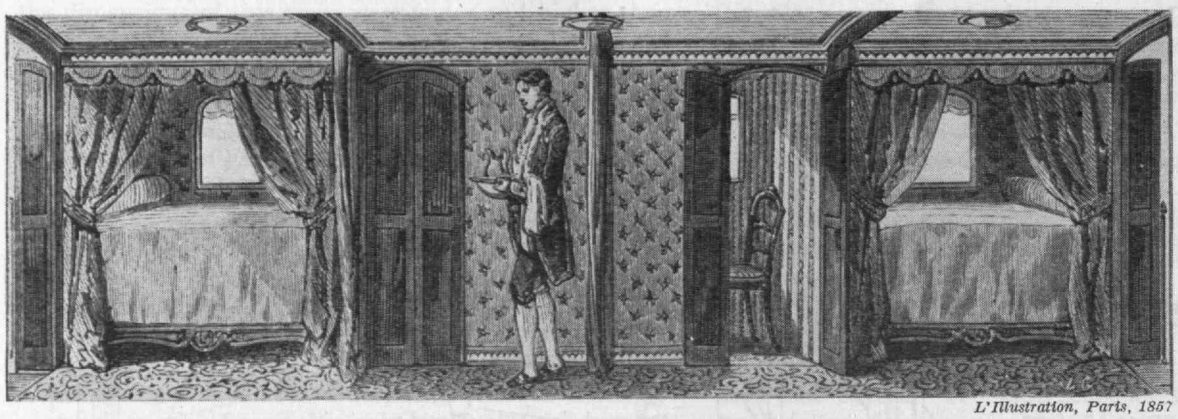
Fig. 7 (upper right). *English invalid's bed, 1794, raised by a complicated mechanism of lines, winch, gears, retarding flywheel, and posts.*

Fig. 8 (lower left). *Thomas Jefferson's bed, Monticello, around 1793. It filled the passage between his study and his dressing room. That it could be hauled ceilingward by ropes during the daytime, as an early tradition maintains, is now denied. Yet it is difficult to understand his building it across an open passageway if he did not intend to make it disappear by day.*

Fig. 9 (lower right). *Interior view of "No. 9," one of the two coaches remodeled by Pullman in 1859. In the daytime the upper berths were pulled up to the almost flat roof by ropes and pulleys. Mattresses, blankets, and pillows (no linen) were stored in vacant section during the day.*

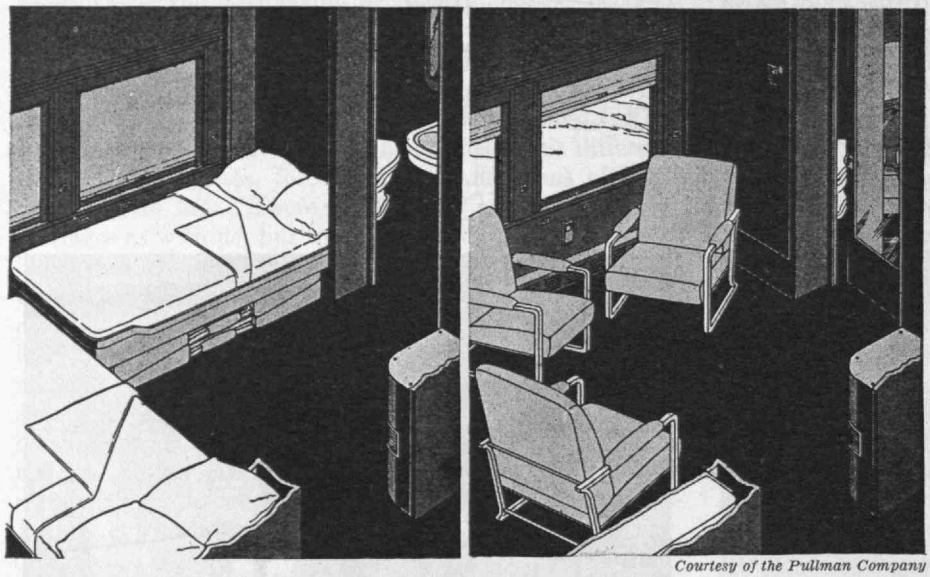
with hinges . . . by raising them up and turning out the lower half." Beds, these boardlike affairs? The inventor did not call them such. He saw himself as converting seats into couches. Indeed, between bed and couch no sharp line can be drawn.

Economy of space is the mother of convertibility. "As many seats by day, so many beds by night" went the rule of the early days. Often more beds would be conjured up than there were seats in the same place. This sleight could be achieved only if one of the beds were caused to



L'Illustration, Paris, 1857

Fig. 10. "Train Impérial," presented to Napoleon III by the Compagnie de Chemin de Fer de l'Est, 1857: interior of the imperial couple's bedroom, showing the fixed beds



Courtesy of the Pullman Company

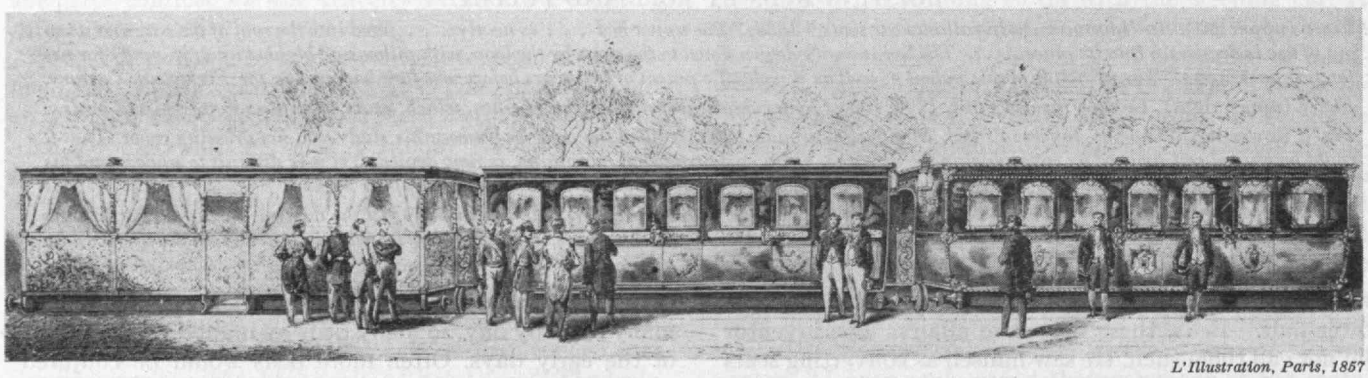
Fig. 11. "Master Room," Pullman Company, 1939: the convertible room for night and day use. Comfort equal to a two-room apartment is achieved by folding beds and a number of folding chairs. Comfort here is based on convertibility, in contrast to Napoleon III's rigid room and fixtures.

Thomas Jefferson had a strong predilection for mechanically actuated furniture, automatic folding doors, and so on — consider the wine-bottle elevator between his cellar and dining room. The beds in his home at Monticello were built into sleeping alcoves in the usual way. Alone Thomas Jefferson's own bed stood in a peculiar place (Fig. 8). It filled the passage between his study and his dressing room. That it could be hauled ceilingward by ropes during the daytime, as an early tradition maintains, is now denied. On the other hand, one can hardly understand his building it across an open passageway if he did not intend to make it disappear by day. The idea of an ascending bed is to be found in an English patent for an invalid's bed [18] (Fig. 7), granted at the time when Jefferson was remodeling Monticello. In this patent a complicated mechanism of lines, winch, gears, and retarding flywheel was provided to raise and lower the mattress frame between four sliding posts.

disappear into the ceiling. It would reappear when needed, like the magic "set-thyself" table at the wedding feast of Marie de Médicis in Florence.

A Detroit inventor for instance proposed in 1858: "The upper bed . . . is neatly and compactly fitted into the roof of the car, and when out of use is drawn up into its place by four counter-weights and cords from its corners, and no one would suspect anything but the roof to be there. . . . The bed is easily drawn down to the stops by the loop, with pillow and blanket upon it, ready for use for two passengers" [17] (Fig. 6).

The upper berth of the sleeping car is the real space-saving factor. But beds let down at the end of ropes no longer afforded a convincing solution. Even before the Detroit inventor's proposal, the present-day construction of the upper berth in the American sleeping car had been found. This happened toward the end of 1856, when the second patent was taken out.



L'Illustration, Paris, 1857

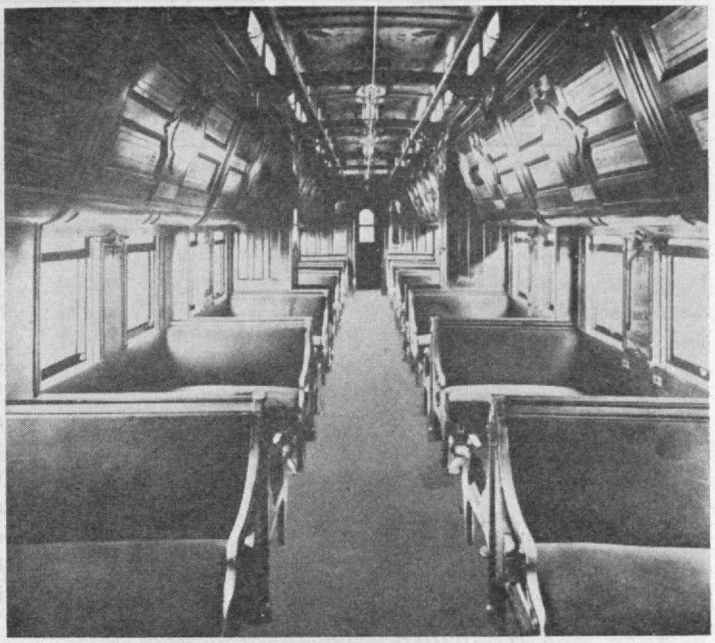
Fig. 12. "Train Impérial," presented to Napoleon III by the Compagnie de Chemin de Fer de l'Est, 1857: view of the observation car, dining car, and "drawing-room car"

To lay bare at the first stroke a principle on which a whole later development will be based is not exceptiona at this period. In the mechanization of the ousehold we can see how, at the outset, some devices — from so modest a utensil as the rotary egg beater (1856) to the vacuum cleaner (1859), the dishwashing machine (1865), the washing machine with gyrator (1869) — were straightway laid down in the principles that were to guide their future development.

It was Pullman's rival of his early days, Theodore T. Woodruff (1811–1892), who worked out the decisive solution for the folding bed in the sleeping car [19] (Figs. 4 and 5). His was true inventor's blood. From the viewpoint of 1850 he belonged to the modern type of wagon builder. To make a bed disappear into the ceiling by hauling on ropes was too awkward for him. To him furniture meant a series of mobile planes to be combined in various ways. It is a pleasure to observe how skillfully he uses hinges for his purposes, swinging up the back rest of his seat through 90 degrees to a horizontal position, so obtaining two middle berths. The seat bottom folds down to a lower position, where a horizontal plane is waiting to join with it; this gives him two more berths near floor level. Decisive is the idea of hinging the upper bed above the window. By day it forms a connecting surface between the ceiling and the wall of the car. Woodruff phrases it in simple words: "Hinged . . . frames are arranged in such a manner that they can be converted into a couch above the car windows." Woodruff conceived the folding bed with its hinges as others before him had conceived the folding chair. This was new.

Nevertheless, Woodruff's patents still did not speak of the sleeping car but only of a "car seat and couch." The space available for each person was indeed limited. One realizes that Woodruff could accommodate five people in this manner, four in the two lower berths and one in the topmost.[20] Today one recognizes the guiding role played by Woodruff's proposal to fold the upper berth between the wall and the ceiling. "It presented for the first time the idea of a folding upper berth, it was a radical departure from the arrangements in use before. . . . While the invention of the sleeping-car is commonly associated with other names, the credit for the original idea and for priority of patent and for having constructed under his patents the first practical sleeping-car, belongs to Theodore T. Woodruff." [21]

Theodore T. Woodruff was a wagon builder who, like so many of his contemporaries, designed all manner of machines: steam plows, reapers, locomotives, and ships' propellers. To promote his sleeping cars he formed a company of two million dollars' capital (1857). His cars ran successfully on many lines. Then, in the early Seventies, he brought action for infringement of patent against Pullman, who had adopted the sideways and inclined disposition of the folding bed for his palace cars. The decision went in Woodruff's favor, but Pullman was already the stronger. "No part of the judgement was ever collected and by a strange miscarriage of justice the Pullman Company continued to use the Woodruff patents and prospered, while Woodruff's company was practically ruined and the rightful inventor's name became almost entirely forgotten." [22]



Courtesy of the Pullman Company

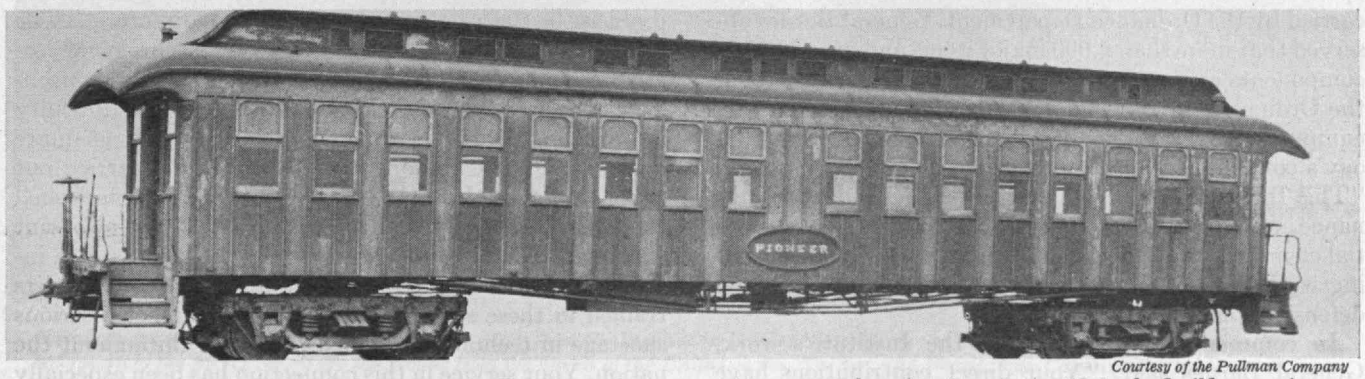
Fig. 13. Interior view of Pullman's Pioneer, *1865*

(To be concluded)

References

[1] The hotel car combined the sleeping and dining cars; the dining car pointed to the present-day type. Pullman's patents for these types were granted the following year, 1869 (United States Patents 89,537 and 89,538, April 27, 1869).

[2] First train to be equipped with it, 1886; patented, 1887. For its reception by contemporaries, see Horace Porter, "Railway Passenger Travel," *Scribner's Magazine*, IV: 296–319 (September, 1888). About a half century later (1934) the streamline train came in. But this innovation, like the streamlining movement as a whole, is more a matter of formal design. (*References are concluded on page 132.*)

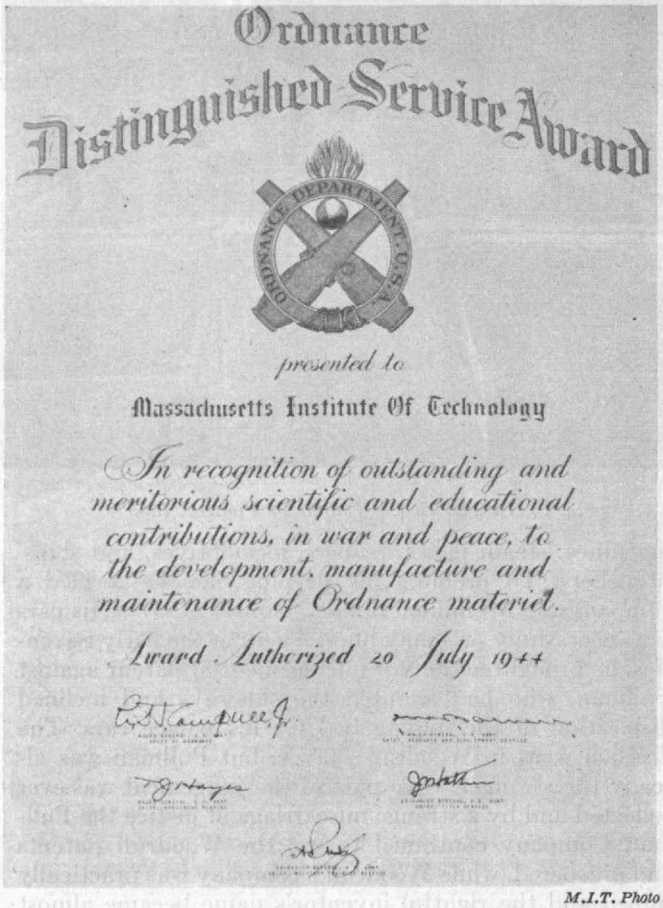


Courtesy of the Pullman Company

Fig. 14. Exterior view of Pullman's Pioneer, *1865. The elongated car, so propitious to travel comfort, is made possible by the flexible mounting on bogies, no less characteristic of American travel than movable seats and couches.*

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE



M.I.T. Photo

For Distinguished Service

CONTRIBUTIONS of the Institute to the success of the munitions program of the United States in this war were signalized on commencement day, October 30, by the presentation to Technology of the Distinguished Service Award of the Ordnance Department of the Army. Major General G. M. Barnes acted for the Chief of Ordnance, Major General L. H. Campbell, Jr., in making the presentation, and acceptance in the name of the Institute was made by President Compton.

Summarizing the procurement program which developed into the most stupendous undertaking ever to be carried by the Ordnance Department, General Barnes observed that more than 2,000 major items and over 300,000 components are involved in it and that the grand total of the Ordnance program for the manufacture of arms and equipment to date is about $65,000,000,000. Of Technology's contribution to the program, General Barnes said: "This Institute has been so closely associated with Ordnance activities that we have come to regard it as an essential element in the Ordnance system. It has been performing work of great importance in furthering the national defense of our country."

In commenting specifically on the Institute's work, General Barnes said: "Your direct contributions have been unusually effective. Security restrictions and lack of time limit me in describing them. Only a few may be mentioned; the full story must be left for a future date. I can mention the work in general of your Servomechanisms Laboratory, which relates to the problem of automatic and remote controls. These systems, which perform motions of great precision, have many applications in modern warfare. Notable in these developments were the oil gear M3 for antiaircraft gun laying and the hydraulic turret controls for combat vehicles. Members of your staff have co-operated in an outstanding manner in the development of many types of fire-control instruments. In the development of radar, the Institute is preeminent. Radar is now finding increased application in Ordnance fire-control equipment. Some of these applications have had extensive combat use with notable success. Your Institute has carried out many other projects of great importance to Ordnance research and development in the fields of optics, testing methods, metallurgy, and instrumentation. Your scientists have acted as consultants on many problems of vital concern to the department. Many of them have directed numerous development projects for the National Defense Research Committee, which have made valuable contribution to research and development of Ordnance matériel. Personnel from your Institute have held, and are holding, responsible positions in other government agencies whose activities have had a direct bearing on the success of the Ordnance program.

"When the emergency came, the Ordnance Department was less than 1/30 of its present size. The need at that time for trained, skilled, commissioned personnel and engineers was desperate. Your Institute was one of only eight universities which provided Reserve Officers' Training Corps work in Ordnance as part of their curricula. The men trained by your R.O.T.C. furnished part of the nucleus around which we have built our huge program. In the years between the last war and this one, the M.I.T. provided advanced technological training for a number of regular Army officers in the Ordnance School. This training gave those officers the necessary technical background which helped us utilize science to the best advantage in the development of weapons for this war. . . .

"Here at the Institute you established, under the able leadership of Dr. Compton, emergency courses for engineers and inspectors. Inspection has always been a major problem in the procurement of Ordnance matériel. The tremendous and rapid expansion of the procurement program early in the emergency greatly intensified this problem, which was still further aggravated by the difficulty in providing qualified Ordnance inspectors with adequate background. The training courses which you carried out greatly relieved this problem. You not only accomplished this significant work at the Institute but you also sent your staff members to Watertown Arsenal to assist in instructing personnel in this important field. The engineers trained in these special courses helped to meet a serious shortage in technically trained personnel throughout the nation. Your service in this connection has been especially helpful to the Boston Ordnance District in mobilizing

industrial facilities in this area. In addition to the services which you have rendered directly to the government, you have been a source of scientific knowledge and technology upon which industry has relied during this emergency for the solution of many technical problems.

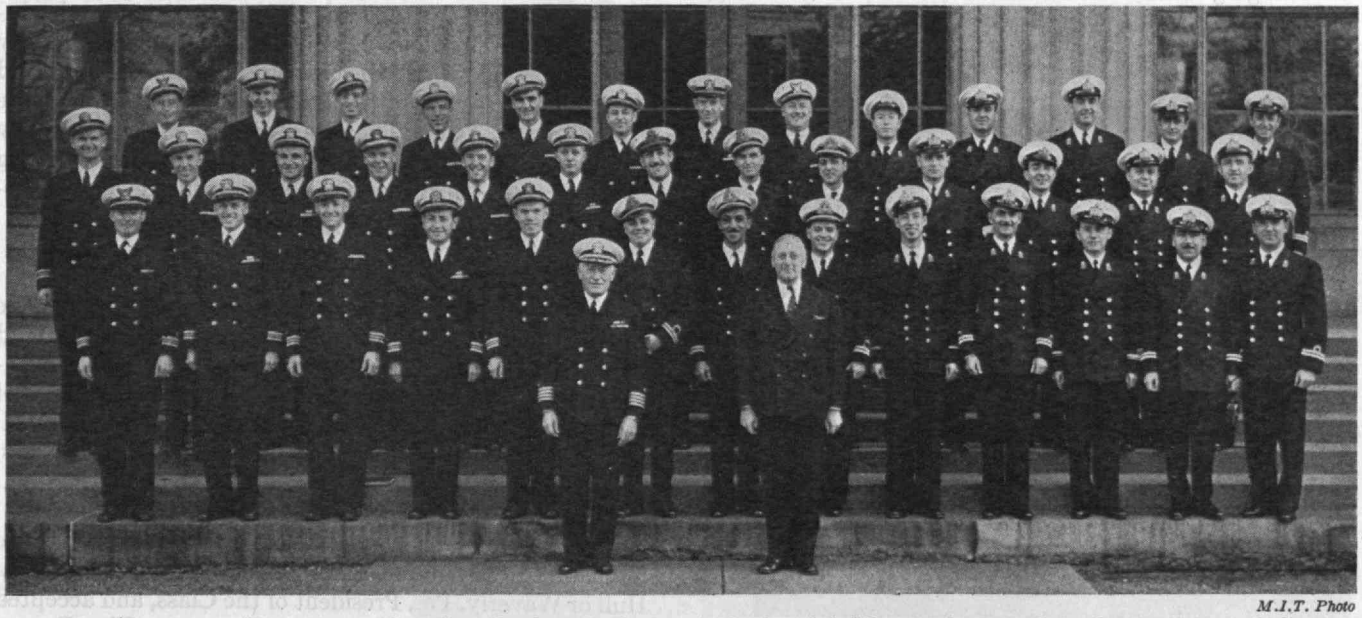
"This war is a war of fire power. Our armies are driving into the heart of fortress Europe and into the inner defenses of the Japanese Empire because they can deliver a crushing weight of steel and high explosives on the enemy strongholds. The Institute has an important part in providing that superiority of fire power behind which our soldiers can advance with a minimum loss of lives. . . .

"In presenting the Ordnance Distinguished Service Award to the Massachusetts Institute of Technology, public acknowledgment is made of the work which you have done, both in peace and in war. It is our hope that this award not only will serve as recognition of outstanding past performance but also will stand as a tangible symbol of future co-operation."

Accepting the award, President Compton pledged the Institute's best efforts to justify it in the future as well as in the past "through continued co-operation with the Ordnance Department in the tackling of technical problems and the training of technical officers." Dr. Compton cited examples from his own experience and from history to indicate that "ordnance is an ancient and honorable art which men have developed from the beginnings of time, primarily for their own protection and often, unfortunately, for purposes of aggression." In America, Dr. Compton said, there is still the faith to believe that wars of aggression can be banished, and there is firm intent that this country shall not use ordnance or sacrifice its youth for conquest.

Continuing, he said: "But we also have an unquenchable purpose to protect the freedoms for which our race has struggled for so many centuries, and for the purposes of this protection we need ordnance of the most effective types. For this reason we are proud of the accomplishments of the Ordnance Department of our United States Army, and we are glad that we have had the privilege of co-operating with this department in some of its recent developments. There is no time to describe here even one or two examples of these recent developments, but I think it would be permissible to suggest their significance by just one example which is of personal interest to me. One of my assignments in the last war was to study and report on the antiaircraft defenses of Paris. In that connection I learned something about the statistics of antiaircraft fire by day and by night. These statistics gave, among other things, the average number of thousands of rounds fired per enemy plane brought down. We all know that the problem of getting a shell sufficiently close to such a distant, fast-moving, and possibly erratic target as an airplane, and of timing the fuse for explosion at just the right time, is tremendously complicated. Technical developments which increase the ratio of hits by a factor somewhere between 100 and 1,000, as compared to the figure of the last war, would be technological achievement of no mean dimensions and obviously could not be accomplished without technical skill of high order in many co-operating lines of science and engineering.

"From the technological point of view, ordnance is of particular interest to an institution like ours because, in one way or another, it makes demands on nearly all the special fields in which we are active. The chemistry of explosives is a highly scientific subject with many ramifications, and the production of explosives is a great problem for the chemical engineers. Both offensive and defensive armament have been among the greatest incentives to the development of metallurgy. The newer science of aerodynamics is important in figuring the flight of projectiles, and meteorology also has its uses. The weapons of ordnance are masterpieces of the mechanical engineering art. Problems of trajectories and fire control challenge the ablest efforts of mathematicians. Because in actual use the gun and the gunner operate as a unit and the man cannot be separated from the machine in its performance, the physiologist and the psychologist have their roles. The electrical engineer and the physicist are essential in the development of control, sighting, and calculating



M.I.T. Photo

Naval officers of three nations were graduated together from the Institute in October, their life as students together reflecting changes which war has meant to the M.I.T. Here are the group, from the navies of the United States, Turkey, and Brazil, with Captain Charles S. Joyce, commanding officer of the naval training schools at Technology, and George C. Manning, '20, Professor of Naval Architecture and Executive Officer of Course XIII-A.

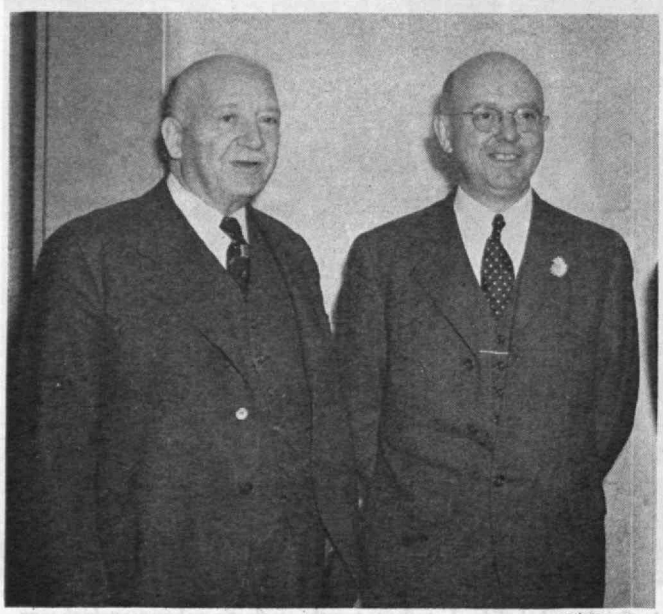


On commencement day, President Compton with, from left to right, Colonel H. B. Sheets, commanding officer, Boston Ordnance District; Major General G. M. Barnes, chief, research and development service, Ordnance Department, United States Army; and Captain Roy L. Lewis, district chaplain, First Naval District

M.I.T. Photo

mechanisms. It would take very little stretching of the argument to include such things as railway mounts, self-propelled guns, tanks, and buzz bombs to bring in the civil, automotive, and other types of engineers. We can even include the architects and architectural engineers, since their structures are frequently on the receiving end of ordnance operations. In fact, it would be hard to think of any one activity which touches so completely on nearly every department of Technology as does ordnance. We have always felt at the Institute that our greatest opportunities for service to government or industry lay in the tackling of scientific or engineering problems the solution of which calls for co-operative attack by specialists in a variety of related fields. This is certainly a characteristic of the problems of ordnance.

"For all these reasons it is especially gratifying and encouraging to the Massachusetts Institute of Technology to receive this Distinguished Service Award and to receive it at the hands of so eminent a representative of the Ordnance Department as General Barnes."



M.I.T. Photo

Charles E Locke, '96, Secretary of the Alumni Association, and Raymond Stevens, '17, President of the Association, in a Class Day moment

Commencement

THE Institute's Class of 10-44 was graduated on October 30, when 197 degrees were awarded at ceremonies in New England Mutual Hall, Boston. Among those receiving degrees were officers of the United States, Turkish, and Brazilian navies. This fall's graduating class also included nine young women. Bradley Dewey, '09, President of the Dewey and Almy Chemical Company and formerly Rubber Director of the War Production Board, gave the commencement address, which is presented in this issue of The Review, as is Dr. Compton's valedictory to the graduates. A special feature, reported elsewhere in the "Institute Gazette," was the presentation to the Institute of the Ordnance Distinguished Service Award by Major General G. M. Barnes, chief of the research and development service of the Ordnance Department of the United States Army. The award, which was accepted by Dr. Compton, was made in recognition of the outstanding service of the Institute to the Army in the war emergency.

. . . *Class Day* . . .

The traditional exercises of Class Day were held for the Class of 10-44 on Saturday, October 28, in New England Mutual Hall on Boylston Street, where an audience gathered at 2:30 to be welcomed by Gabriel E. de Roetth of Spokane, Wash., chairman of Senior Week. William H. King, '94, of New York City spoke for the 50-year Class, and Wilfred O. Langille, '19, of Elizabethport, N. J., represented the 25-year Class.

The class gift for 10-44, a pledge of a contribution to be made to the Alumni Fund, was presented by John L. Hull of Waverly, Pa., President of the Class, and accepted for the Institute by President Compton. The Beaver oration was delivered by James J. Healy of Babylon, N. Y. The class banner was presented to 10-44 by Ray-

mond Stevens, '17, President of the Alumni Association, acceptance being made by President Hull. The program was concluded with the singing of the new song, *Sons of M.I.T.*, written by Professor John B. Wilbur, '26. The Class of 10-44 is the first Institute Class to have gone on record as urging the adoption of this song as Technology's official "alma mater song," having voted to initiate the proposal that such decision be made.

A tea dance at four o'clock followed the Class Day program. Chairman of the Class Day committee for 10-44 was Cortlandt F. Ames, 3d, of Larchmont, N. Y. J. D. Mitsch, '20, Associate Professor of Structural Engineering, was chairman of the Alumni Association's committee.

. . . *Baccalaureate* . . .

On the following day Rear Admiral Wat Tyler Cluverius, President of Worcester Polytechnic Institute, gave the baccalaureate address in Walker Memorial. President Compton read the Scripture lesson, and the service was conducted by the Rev. Carl Heath Kopf, minister of the Mount Vernon Church, Boston. In his address Admiral Cluverius emphasized the responsibility of every young man to take his place in the great plan of American citizenship. From the standpoint of education, he declared, the graduates had been prepared most adequately. "But there are other things," he continued, "that must obtain in order to make possible the worthy use of your equipment.

"The immediate mission of everyone who calls himself an American is to bring the war to a successful conclusion. The first place you must take is that where you can best contribute to this end, whether in a battle line or in a production line — both are essentials of victory. Industry has furnished the armed forces with the most efficient equipment yet produced by American brains and brawn. Exhaustive research and skillful hands made this possible. Those in uniform who use this equipment are the most intelligent and best prepared men and women who have ever worn the uniform of our country. In a nation at war every man *must* know his place. Americans have given ample demonstration that they know theirs. Our arms,



© Bachrach

Bradley Dewey, '09, commencement speaker

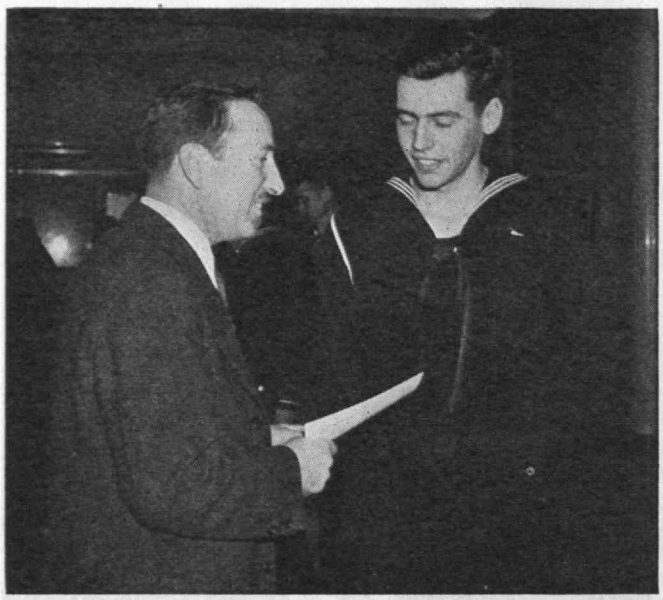
afloat and ashore, are being advanced in marvelous manner, and the enemy who sought to destroy us knows that he himself will be destroyed, instead, — the skillful ruffian across the Atlantic and the fanatic Jap who descended upon us out of the skies at Pearl Harbor are both doomed.

"But let us look beyond to a time when America, the most powerful nation in the world, will be called upon to provide leadership in the rebuilding of the world and to exert her influence in securing enduring peace. In short, in order to accomplish the high mission set by the founders of the nation, this capacity must be developed to the maximum so that she may serve her own citizens and, through them, the rest of the world. This, too, is true nationalism.



M.I.T. Photo

Gabriel E. de Roetth, chairman of Senior Week for the Class of 10-44, center, with from left to right, Cortlandt F. Ames, 3d, chairman of the Class Day committee; James J. Healy, who gave the Beaver oration; Gerald L. MacKinnon, Jr., President of the Class of 6-45; and John L. Hull, President of the Class of 10-44



M.I.T. Photo

J. D. Mitsch, '20, Associate Professor of Structural Engineering, chairman of the Alumni Association's Class Day committee, chats with Beaver Orator James J. Healy, 10–44.

"What, then, is to be your place in the pattern of the new peace? Basically, that place for all who are self-governed is found in good citizenship. Too few Americans realize that the survival of a democracy depends upon an electorate trained in the habits of self-reliance and self-help. If, instead, the people lean on the central government, it cannot survive, for in a democracy the central government is as strong or as weak as is the citizen. In fact, it is the citizen. Democracies in history have all fallen because of this deterioration of citizenship. Plutarch, in his life of Coriolanus, refers to the giving of largess as the first step toward the loss of individual freedom.

"Our form of government has been criticized by others. It was Macaulay, the English historian, who believed that the responsibilities of our free citizenship would prove too much for the individual to bear; that our form of government could not be strong, as a man cannot be entrusted with the government of himself. Jefferson once remarked, 'How then can he be trusted with the government of others? Have angels been found in the forms of kings to govern him?' We have many $64 answers to that one.

"Our place as intelligent citizens is to exercise all the rights and privileges that pertain to our citizenship, and we must agree with the words of Jefferson to 'hold ourselves personally responsible for their preservation.' This is unquestionably the place in which too many Americans stand insecurely; but, thank God, millions of others this moment are fighting back despotic enemies who would destroy our liberties and enslave us.

"You may ask how is this to work in time of peace. In response, I must presume that each of you is a true patriot, that is, one of those who may strive honestly and desperately for world peace yet not fail to raise your hands in your country's behalf in time of stress. There are many pseudo kinds of patriots. They all fall in the category of cowards and can be catalogued as such. I would call many of them patriots through fear, patriots with one desire — that is, to save their hides when danger portends. They need not be considered in time of peace, except to be watched.

"The basis of truly patriotic citizenship is found in character, whose essential elements mark the man. Military character is often differentiated from that of the civilian in a community. But high character permits of no interpretation."

Referring to essential traits, Admiral Cluverius put loyalty as the capstone and faith as the foundation. He stated that with these traits we can stand firmly in our place and, so standing, be sustained by other factors which must be taken into account. Among them are the driving power of an individual, the bodily strength that must be his to negotiate the rough roads of life; the social factor which makes it possible for him to live with other people and to cultivate public spirit; the factor of intellect because this is an age of brains; the factor of time and of economy in the use of it. He referred also to the religious element that has been lacking in the Western civilization of which we boast but which has so often proved a veneer. He stressed the need for Christian citizenship. With all of these components of good character, one is able to make oneself an example of unselfish leadership which is to be a prime requisite of a world returning to peace. Sacrifice is entailed in such leadership.

Financial Operations

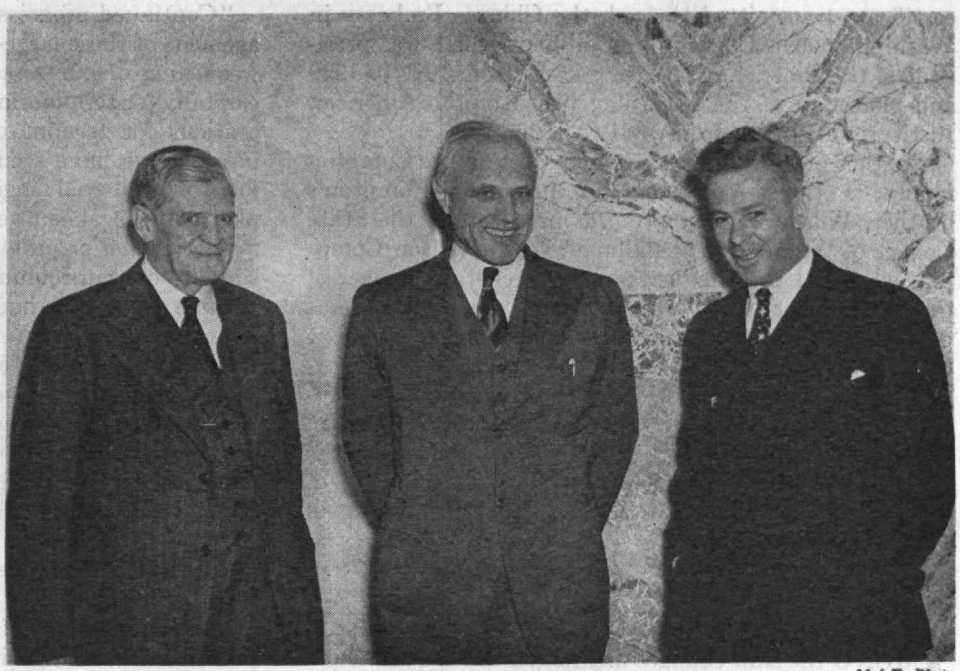
THE rapid expansion of financial and business operations of an educational institution engaged in an accelerated program of war research and special training for the armed forces is graphically disclosed in the annual report of Horace S. Ford, Treasurer of the Institute.

In an informal discussion of the Institute's financial operations during the past year, Mr. Ford made these comments: "Much has been said about the varied wartime curricular and extracurricular activities of the colleges and universities, and their part in the war effort has come to be generally understood. Much less has been said about institutions which have undertaken large research and other government-sponsored war projects in addition to their service training and civilian training programs, and which have seen their financial and business activi-



M.I.T. Photo

President Stevens of the Alumni Association and President Compton have opportunity for a few words before the Class Day program begins.



William H. King, '94, 50-year Class speaker, and Wilfred O. Langille, '19, 25-year Class speaker, with President Compton before the Class Day ceremony

M.I.T. Photo

ties accelerated to a point far beyond the imagination of even their own trustees and officers.

"The Institute is a good illustration of what happens financially to an institution which has gone all out for the war effort. In an ordinary year we handle, budgetwise and otherwise, $6,000,000 to $12,000,000 in cash, of which $4,000,000 to $5,000,000 represent usual operations, and the balance is on account of investment changes during the year. Last year, however, $60,000,000 in cash flowed in and out of Technology's banking accounts. Of this, a total of about $24,000,000 was for changes in investment items. Perhaps in view of the fact that 90 per cent of these changes were in connection with United States Government bond holdings, 'adjustments' would be the better word for it.

"Of the remaining $36,000,000, $5,000,000 represented the turnover in carrying on Technology's normal educational program, its war training activities, its dining services, and its dormitories. Of the $31,000,000 still to be accounted for, $26,500,000 represented the total volume of transactions resulting from the operation of 200 or more war contracts with the United States Government, its services and its agencies, and with industrial companies, all employing 4,500 people over and above the Institute's normal complement of 1,000.

"In addition to carrying on these activities, the Institute has operated a special electronic training school for Army and Navy officers, and it also co-operates financially and shares with the Chemical Warfare Service in its operations in a special laboratory building on the Institute campus. Technology actually paid out $13,500,000 in salaries and wages last year, collected $1,600,000 in withholding taxes, and sent in $700,000 in subscriptions to war bonds on behalf of its staff and employees."

War Service

THE number of Technology Alumni serving in the armed forces of the United States and its allies is now 6,398. Raymond Stevens, '17, President of the Alumni Association, discussing the war record of Technology's Alumni at the first autumn meeting of the Alumni Council, drew attention to the fact that in addition to men serving in the armed forces, thousands of Technology engineers and scientists are contributing directly to the war effort in industrial engineering posts and in various government technical activities.

The number of Technology men serving in the United States Army is 4,040; in the United States Navy, 2,150; in the United States Coast Guard, 52; in the United States Marine Corps, 80; and in forces of other United Nations, 76. Decorations have been awarded to 107 Technology men, and according to our records 77 Alumni have either died in service or been killed in action.

Numbered among the Institute's Alumni in war service are 28 admirals, 1 commodore, and 74 generals, most of whom are in various war theaters of active operations. Two of the Institute's Alumni, Lieutenant General James H. Doolittle, '24, and Lieutenant Colonel Jay Zeamer, Jr., '40, have been awarded the Congressional Medal of Honor, the highest decoration which is given for service to the country.

"No less important than the service of our Alumni in the armed forces," said Mr. Stevens, "are the technical and scientific contributions of thousands of Technology engineers and scientists in various industries and in a great variety of government technical posts, who are doing a magnificent job in hastening the day of victory. The work of these men has been apparent in tangible form on almost every fighting front. They work behind the cloak of secrecy, which is required in the interest of national security, so that the full significance of what they have accomplished cannot be revealed until the war is over."

Honors

THE Chinese Physical Society, from its headquarters at the National Southwest Associated University in Kunming, China, has notified President Compton that he has been unanimously elected an honorary member of the society. Notification of this honor was accompanied by a

certificate transmitted through the Chinese Embassy in Washington. Dr. Compton, it will be recalled, was president of the American Physical Society from 1927 to 1929 and chairman of the governing board of the American Institute of Physics from 1931 to 1936.

Another pleasant bit of news to report on the Compton family is the appointment of President Compton's brother, Wilson M. Compton, as president of the State College of Washington at Pullman, Wash. Wilson Compton, who is at present secretary and general manager of the National Lumber Manufacturers Association, has previously taught economics at Dartmouth College and at George Washington University.

President Compton's other brother, Arthur H. Compton, is professor of physics at the University of Chicago, and in 1927 won the Nobel Prize for research in cosmic rays. These three distinguished brothers, all graduates of the College of Wooster, form a unique triumvirate in American education.

Staff Changes

AMONG the staff changes mentioned in the President's annual report was the appointment of Major A. A. Wagner to the post of professor of military science and tactics and head of the Department, to succeed Lieutenant Colonel Joseph F. Cook, Jr., '22, who has resigned. Captain Lawrence J. Cuddire has been appointed assistant professor of military science.

Rene H. Miller, a graduate of Cambridge University, formerly chief of aerodynamics and development of the McDonnell Aircraft Corporation and more recently stress analyst of the Glenn L. Martin Company, has been appointed assistant professor in the Department of Aeronautical Engineering. Promotions not hitherto mentioned in The Review included the advancement of John T. Burwell, Jr., '34, now a lieutenant in the Navy, and Ascher H. Shapiro, '38, to the rank of assistant professor in the Department of Mechanical Engineering.

The President's Report

IN concluding the comprehensive condensation of President Compton's annual report to the Corporation, which started last month, The Review now presents that part which deals with activities of the past year and opens with a discussion of the Institute's impressive war research program.

"Prior to the war," said Dr. Compton, "the Institute employed approximately 1,100 persons — 600 staff and the rest accessory. The roster now shows a fivefold increase, with employees totaling approximately 5,500, of whom 2,100 are professional staff and 3,400 nonstaff. The increase is largely the result of our war research program and provides one index of its size. . . .

"For the fiscal year 1943–1944, the total volume of all research contracts was about $25,000,000, compared to $16,000,000 in the preceding year. Based upon our complete cumulative total of research expenditures since the war program started, these have been distributed as follows: overhead, 6.6 per cent; salaries and wages, 37.8 per cent; materials and services, 43.3 per cent; buildings, 6.3 per cent; and miscellaneous, 6 per cent. I call attention to the small amount of expenditure for overhead and for building purposes.

"Continued progress has been made in the fiscal management of these large-scale operations, and without any weakening of our research effort we are now preparing carefully for termination. To insure that these fiscal preparations for terminating contracts are as complete as possible, we have secured the services of a well-known firm of industrial engineers and arranged to check all plans with legal counsel."

Educational program. "The Faculty has undertaken to simplify our curriculum, so that we may be in a more favorable position to handle the large number of returning veterans expected after the war. The plan adopted for a trial period reduces the total number of undergraduate subjects by about 20 per cent, by eliminating a variety of hour lengths for subjects of substantially the same content and objective. I believe that this result has been accomplished without significant educational loss and that it will yield a more efficient use of staff and facilities.

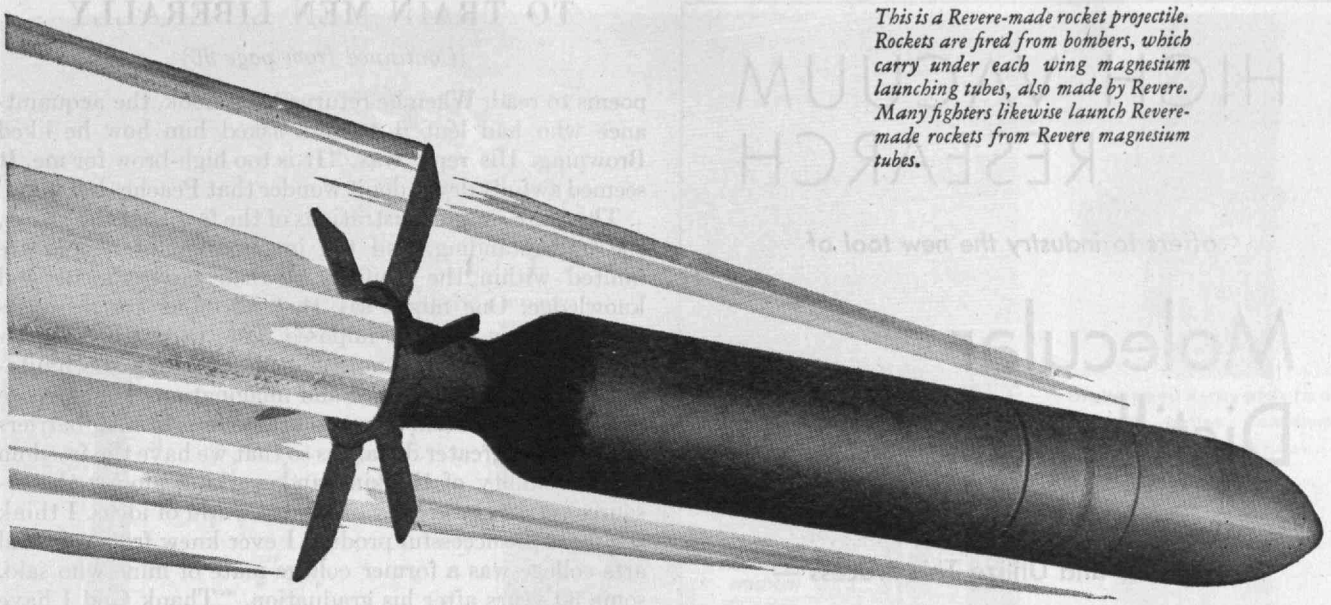
"The Faculty has likewise revised our program in the humanities with results which will greatly strengthen and broaden this aspect of our work without detracting from the professional side of the curriculum. This new program provides for a co-ordinated four-year contact with the humanities. The first year will be devoted to English, with special emphasis on written and oral expression. The same instruction will not be given to all students; those who are ready for fairly advanced composition will have an opportunity to work at their level. The work in English for foreign students will be given by the Department of Modern Languages and, when necessary, taught from the point of view of persons studying a second language. The emphasis on good writing and expression will continue to be stressed in other subjects throughout the remainder of the four-year program.

"In the second year all students will have an introductory course in modern history, with special reference to the place of the United States in world affairs. This course will give the student historical perspective and a knowledge of the development of American civilization, and will incidentally further his training in written and oral expression. In the third year all undergraduate students will devote the first half year to economic principles, and in the second half year will have the choice of a course in introductory psychology, one in labor relations, or one in industrial economics.

"With this background in English, history, and the social sciences, every student in his fourth year will choose one of four options: (a) history of science and thought, (b) fine arts, (c) introduction to literature, or (d) international relations. Each of these four courses will be closely co-ordinated with the background and objectives of those given in the preceding three years.

"Among other significant educational changes may be mentioned the establishment of food technology as a separate division of the Department of Biology and Biological Engineering, and the decision to offer an undergraduate, in addition to the existing graduate, curriculum in Meteorology."

War training. "Our Navy V-12 program has continued undiminished and our quota for the term beginning in November was reduced only about 8 per cent. The Institute is proud to participate in this service program. It is soundly conceived and effectively managed by the Navy, the students in our unit are excellently qualified, and their morale is fine. The (*Continued on page 140*)



This is a Revere-made rocket projectile. Rockets are fired from bombers, which carry under each wing magnesium launching tubes, also made by Revere. Many fighters likewise launch Revere-made rockets from Revere magnesium tubes.

It's GOT to be PERFECT!

Revere has made over two million rocket projectiles out of Revere Electric Welded Steel Tube

Rocket Projectile Facts

Propelling charge is a special powder producing great heat and pressure as it burns.

High-explosive head contains pentolite, 20% more powerful than TNT.

Projectile has the devastating effect of a 105-mm. shell.

Unlike a shell, a rocket is fired without recoil, and hence can be discharged from a plane, from ships too small to carry artillery, or from light launching apparatus used by ground troops.

Rocket projectiles are used to destroy fortifications, tanks, planes, ships, submarines, and against enemy troops, in France, Italy, Russia, and the Pacific.

They are probably the most effective of projectiles per pound and per dollar.

Thus the war comes rocketing to an earlier end!

Look at that rocket projectile streaking through the air faster than the airplane flies!

Think of the terrific heat and pressure required to propel that rocket with such amazing speed and accuracy!

And then remember this:—Revere not only developed those projectiles at Army Ordnance request, but has made over two million rocket projectiles and rocket targets out of Revere Electric Welded Steel Tube.

Any steel tube suitable for such a purpose must be not merely good, but PERFECT. It must pass a pressure test of over 5000 pounds per square inch!

What this means to YOU

It will be great good news to you that today our facilities are so large that we are once again able to fill commercial orders, on a priority basis only.

If you need steel tube for boilers, condensers, water and steam lines, or for general pressure or mechanical applications, consult Revere. We will not only supply high-pressure electric welded steel tube, but will cooperate with you in working out any problems in specifications, selection or installation. Revere has been welding steel tube electrically for 25 years. We *know how.*

May we work with you *now* in formulating your plans for the use of steel tube?

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TO TRAIN MEN LIBERALLY

(*Continued from page 96*)

poems to read. When he returned the book, the acquaintance who had lent it to him asked him how he liked Browning. His reply was, "It is too high-brow for me. It seemed awfully dry. I don't wonder that Peaches left him."

These are simple illustrations of the fact that the vision, the understanding, and the imagination of people are limited within the confines of their environment and knowledge. One might say that all of us are prisoners within certain confines imposed upon us partly by accident, partly by environment, and partly by the limitations of our own initiative and imagination. The purpose of a liberal education is to push these imprisoning barriers out to much greater distances so that we have the freedom and possibility of thinking and working among the resources of a very greatly expanded world of ideas. I think the most unsuccessful product I ever knew from a liberal arts college was a former college mate of mine who said, some 30 years after his graduation, "Thank God I have changed none of my ideas since I entered college."

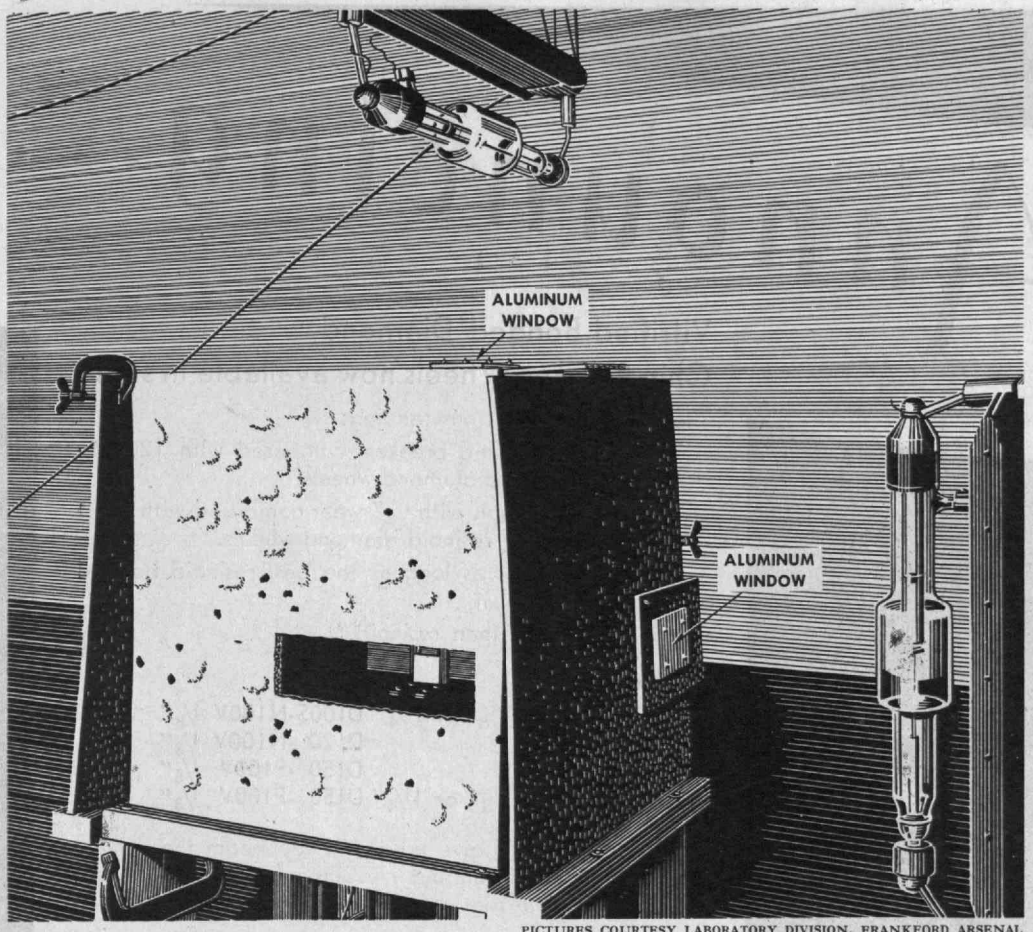
I think that sometimes we have not properly understood the meaning of a liberal education. We have perhaps been confused by the notion that it should be based on the classics of Greek or Latin or on mathematics or philosophy. But these are not in themselves the basic elements of a liberal education. They are components of many liberal educations by tradition, because they have contributed greatly to the increase of the wealth of ideas and the scope of the imagination of those who have studied them. But any subject which expands the horizons of men's thinking is a liberalizing subject.

There was a time when European literary culture was to be found only in Greek and Latin writings. It was in this literature of history, poetry, philosophy, political science, and a certain amount of natural science that men of that day had the opportunity to increase the boundaries of their knowledge and interest. Today we can find this opportunity in many languages — in the classics of the Chinese, in French or German literature, or in the great wealth of our own English literature. In philosophy, whatever be its language or origin, we read of the progress which men have made in their efforts to understand themselves and their environment and their reaction to their environment. In religious literature we find the record of their efforts to understand and define their instinctive spiritual aspirations and to find a rational explanation and definition of conscience and of ethics. In history we learn of that agelong sequence of thought and event which have made us and our environment of today.

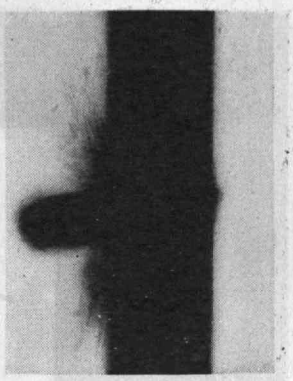
It is not always realized that science has played one of the most important of all roles in liberal education. When Alexander the Great placed at the disposal of Aristotle 10,000 research assistants who traveled to all parts of the then known world and brought back to Greece information about the wonders of men and beasts and mountains and oceans, the information thus made available to the Greek people gave them a liberalizing education. It expanded their vision beyond the much narrower confines of their local environment.

From the days of the Renaissance to the present time, discoveries in science and the dissemination of scientific knowledge among the people have been of enormous

(*Continued on page 116*)



PICTURES COURTESY LABORATORY DIVISION, FRANKFORD ARSENAL



High-speed X-ray picture of cal. .30 bullet penetrating 1/2 inch thick armor



High-speed X-ray picture of same bullet 20 millionths of a second later

14,285 times quicker than a wink

Westinghouse research engineers have developed an ultra-high speed X-ray tube that makes possible X-ray pictures, taken at the terrific speed of *one-millionth of a second.* These pictures show armor-piercing bullets penetrating ½ inch of solid steel armor plate.

The action is 10,000 times faster than any conventional X-ray—literally 14,285 times *quicker than a wink!*

Secret of this revolutionary X-ray is the new type tube that can handle a jolt of 2000 amperes, at 300,000 volts. This is applied in a flash by electrostatic condensers—creating a tremendous surge of *X-radiation.*

With this new X-ray, U.S. Army ballistic experts can "freeze" the image of a bullet, while it travels within a gun barrel at 2600 feet per second—or study the action of projectiles as they smash through armor plate.

When peace returns, this new example of Westinghouse *skill in research* will enable machine builders to study the strains in rapidly moving parts—improve performance and increase the life of peacetime products.

Westinghouse Electric & Manufacturing Company, Pittsburgh 30, Pennsylvania.

KEEPING UP WITH *Electricity*

MAN-MADE HURRICANE BLOWS OUT ELECTRICITY. Engineers can now "blow out" electricity as easily as you extinguish the flame from your cigarette lighter. Circuit breakers built by Westinghouse unleash a 600-mile-an-hour blast of compressed air to snuff out powerful short-circuit arcs and prevent damage to vital electrical equipment on power lines. The hurricane of air can smother a 1,000,000-kilowatt electric arc in less than a hundredth of a second.

REPRESENTATIVES OF 257 PRE-WAR PROFESSIONS, businesses, and trades are now employed at the Westinghouse operated Naval Gun Plant at Louisville, Kentucky. Included are: former circus performers, several embalmers, a former professional hill-billy musician, and a pipe-organ builder. Despite their unusual peace-time occupations, all here have been able to learn the amazing high precision needed in making Naval guns.



A NEW GUNSIGHT LAMP that enables American gunners to aim *directly into the sun* and yet fire with deadly accuracy has been developed for the Army and Navy by Westinghouse Lamp Engineers. Former gunsight lamps allowed gunners to aim within only 15 degrees of the sun, leaving a dreaded "blind spot."

FREE . . . "Engineering Highlights of 1944"—a 32 page book, filled with interesting articles on new developments in electrical research and engineering in wartime. Write: Westinghouse Engineer (TR-124).

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Vitrified Bonded Diamond Chip Breaker Wheels now available in stock

Their performance is outstanding:

"Grinds 20,000 chip breakers compared with 1200 to 1500 with resinoid diamond wheels."

"Ground 2404 tools with 1/8" wear compared with 1350 with 1/4" wear of resinoid diamond wheels."

"Lasts four times as long as the best resinoid bonded diamond wheel."

"Cutting faster than resinoid."

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4" x 1/4" x 5/8" or 1 1/4"	D100S-N100V	1/8"
	D120 -N100V	1/8"
	D150 -P100V	1/8"
6" x 1/4" x 5/8" or 1 1/4"	D150 -P100V	1/8"

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1944

NORTON ABRASIVES

Electronics Engineer

Preferably with a doctor's degree, but not necessarily, with a sound training in the theory of electronics. Preference given to one with at least five years' experience in this field, some of it in research.

Electronics Engineer

To solve electronics problems which would be assigned to him and to suggest new electronics applications. Must have at least a bachelor's degree in electrical engineering and a sound training in mathematics and electronics. Some practical experience in application of electronics desirable.

Servo-Mechanism Specialist

Who would be expected to analyze servo-mechanisms submitted by others, and to devise and suggest applications. Should have at least a bachelor's degree in engineering and have a sound mathematical training. One with at least five years of practical experience in this field preferred.

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For electron microscope studies. Will be expected to prepare samples, with help if necessary, and draw conclusions from studies where possible. Will be responsible for equipment care and maintenance.

Must have a bachelor's degree, either in engineering or biology, and preferably should have done work on an electron microscope.



These positions are basically for peace-time activities, although meanwhile some war work is being carried on.

Applications giving details of education and industrial background, personal data, and salary expected will be held in confidence.

UNITED SHOE MACHINERY CORPORATION

Research Division

Balch Street • Beverly, Massachusetts

TO TRAIN MEN LIBERALLY

(*Continued from page 112*)

liberalizing influence. This knowledge has freed mankind from the ignorance which forged fetters of superstition and dread and which had led to belief in witchcraft and devils. The discoveries in astronomy which disproved the old idea that the earth and we are the center of the universe still arouse enormous popular interest and wonder at the greatness and orderliness of the universe. Benjamin Franklin's experiments with static electricity and his discovery of the electrical nature of lightning were another advance which aroused very great popular interest. To be sure, his lightning rods were condemned by certain elements in the clergy who complained that Franklin was taking away from the Lord Almighty the power of frightening His children by thunderstorms for the disciplinary good of their souls. Removal of this fear of lightning is only one of thousands of illustrations of the increased freedom which has come to mankind as a result of scientific discovery and the wide dissemination of scientific knowledge.

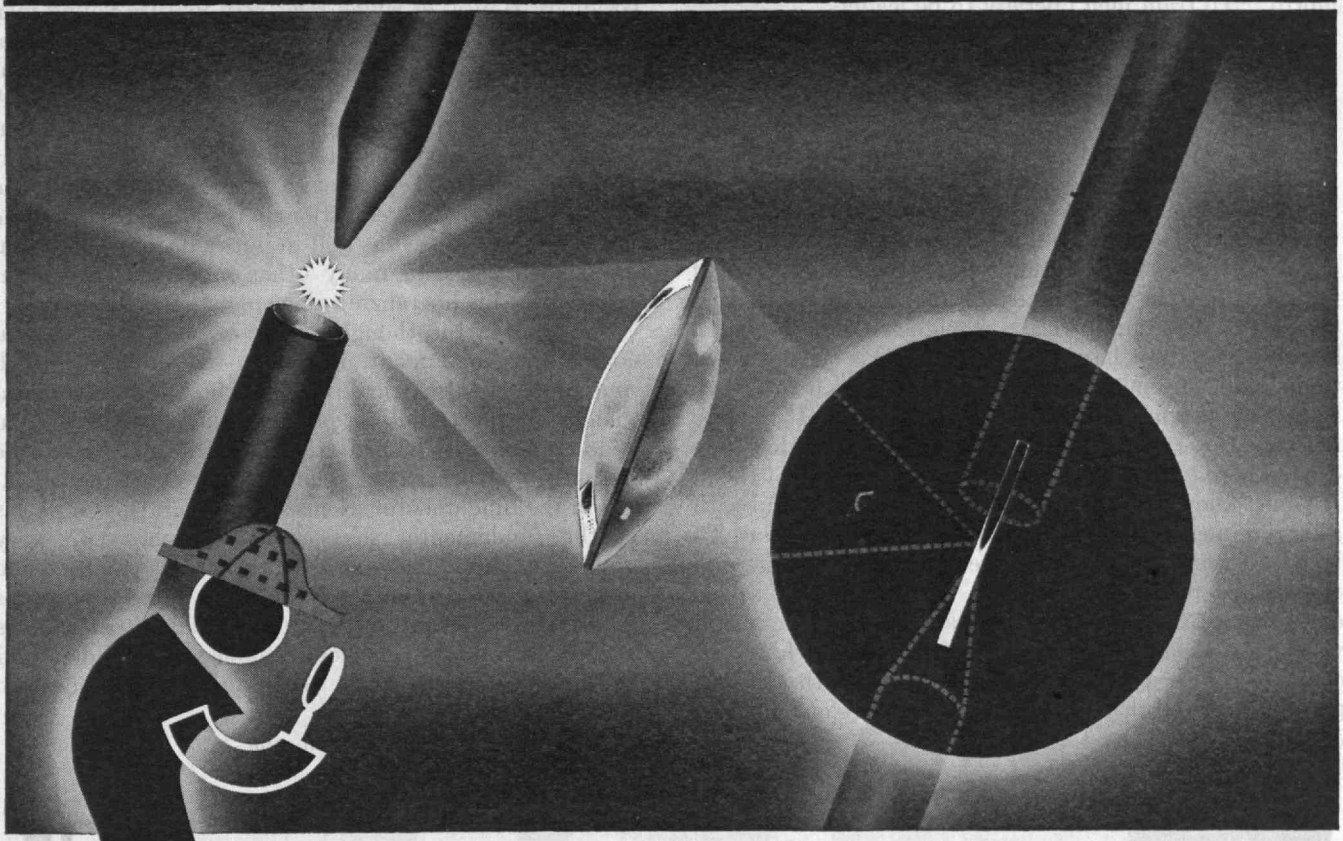
Sometimes I think that the public has become very blasé in reference to science. This attitude is partly explained by the fact that the public has become accustomed to scientific discovery and possibly by the fact that the public mind has been so abused by exaggerated advertising or the sensational claims of pseudoscientific men that it has developed a hard, protective mental coating on this subject. Nevertheless, an illustration of the public's basic interest in science was its reaction to Einstein's theory of relativity. Certainly very very few persons understood this theory, but large numbers of people did get the point that it had opened up some new vistas of human knowledge, and they were fascinated by the realization that some things have to be defined in a "relative" manner and cannot be defined absolutely.

So much for some general and rather scattered comments which I hope have served to bring out the general idea of what is meant by a liberal education. Our institutions of higher learning are generally classed as either liberal arts colleges or professional schools. The Institute is classed as a professional school. By its charter it is devoted to education in industrial science and to the advancement and practical applications of science in the arts, agriculture, manufactures, and commerce. In so far as it advances knowledge, it contributes directly to the "liberalization" of mankind. In so far as it is a school of industrial science and a place for the application of science to practical affairs of life, it is primarily a professional school. Yet a professional school can be operated in such manner that it not only trains in professional skills but simultaneously enlarges the horizons and the capacities of its students. To the extent to which it performs this latter function, it is providing some elements of a liberal education.

The Corporation and Faculty of the Institute have endeavored to achieve this combination. The primary function has been to educate and train students to a good degree of professional competence. Simultaneously, however, the institution has made its best effort to liberalize this training. It has done so with the clear belief that professional men who can combine professional skill with wide vision, understanding, and imagination regarding many things which do not at first appear to be details of

(*Continued on page 118*)

SPECTROGRAPHITE No. 1



. . . . a new Stackpole high-purity graphite for chemical and metallurgical analysis

Spectrographite No. 1 is made by a special process recently developed by Stackpole. Whereas normal graphite anodes contain total impurities on the order of .02 to .05%, Spectrographite contains less than .001%. Thus, it is used in analyzing such things as batches of molten metal, or in checking the purity of liquids by the spectrographic process.

Ordinarily, high-purity graphite is made only by specialized chemical manufacturers, and is of interest only to chemists and metallurgical engineers. In this case, however, we believe Stackpole Spectrographite No. 1 will prove generally interesting to readers of this publication—not so much because you might use it, but because it offers a convincing illustration of the progressive engineering behind the many Stackpole molded carbon, graphite, and metal composition products you do use.

Spectrographite No. 1 is supplied up to 12" lengths in 3/16", 1/4", and 5/16" diameters. Complete details on request.

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STACKPOLE

EVERYTHING IN CARBON BUT DIAMONDS

TO TRAIN MEN LIBERALLY

(*Continued from page 116*)

their profession, will by such vision be more influential and successful members of their profession and citizens of their country. This, I take it, is the real significance of the motto, "To train men liberally to be leaders."

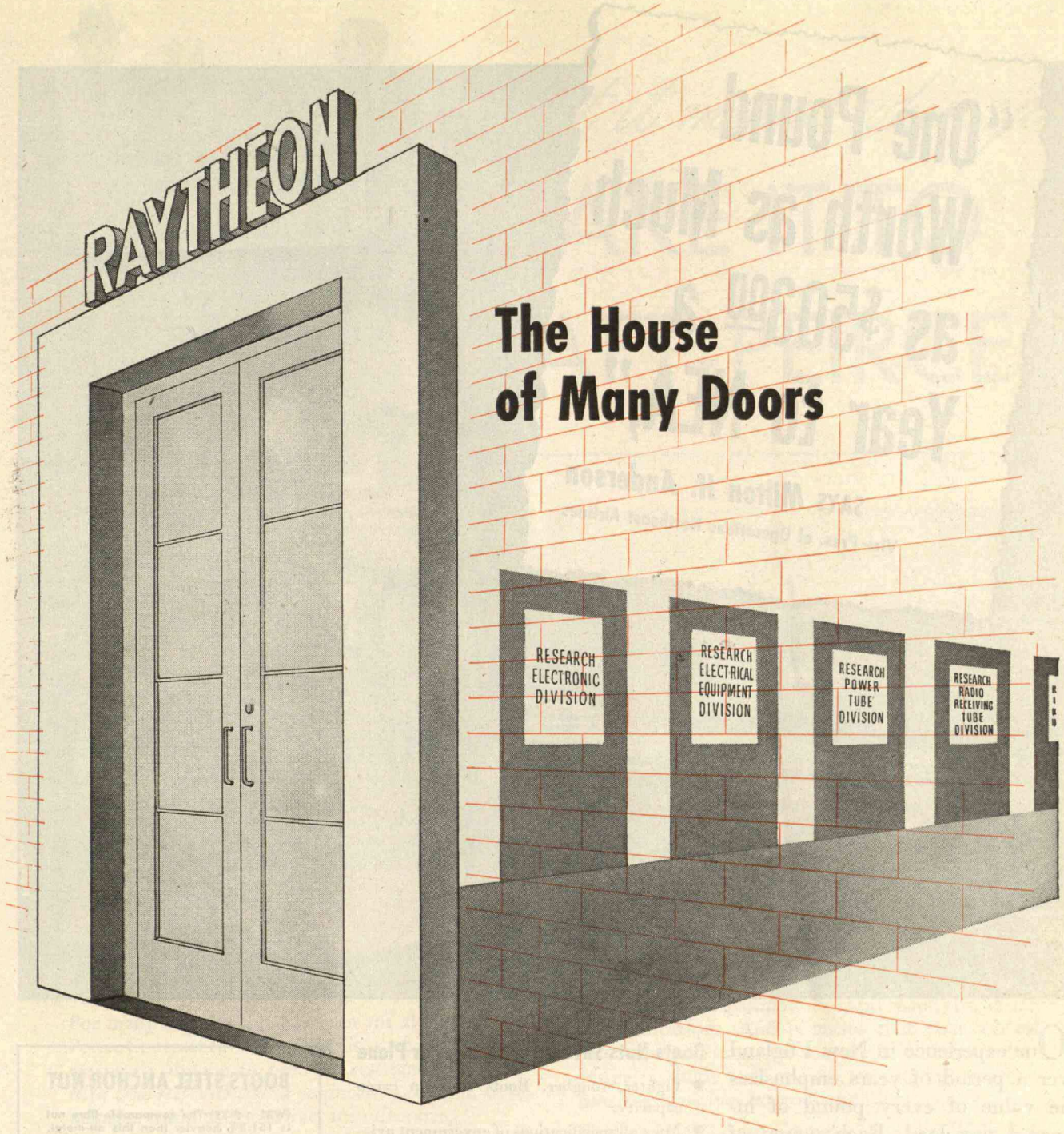
In welcoming the incoming students at Columbia University a short time ago, President Nicholas Murray Butler spoke on the subject "Men or Machines." In this address he made the statement: "If . . . liberal education be even crippled, much less abandoned, then no matter how successful vocational training may be, its products will not be men but machines." A typist, a slide-rule operator, a draftsman, an antiaircraft gunner, or an engineer whose work is limited to the application of formulas from the textbook or the engineer's handbook, is essentially only an intricate machine. To be a liberal leader a man must have far more than this type of vocational skill. He must have resources on which to call to meet new and unexpected types of problems. If he does not have these resources, he must at least know that they exist, where to find them, and how to make use of them. He must know how to deal effectively with men and with groups of men, as well as with machines and formulas. To be a leader and an effective citizen he must have interests outside his profession, interests which will add to his enthusiasm for living. He must have ideals of right and wrong, of social justice and sportsmanship, which can come to him only through acquaintance with the fine personalities and the noble thoughts that are our heritage of the present and past.

In your training at M.I.T. and in the environment in which this training has been conducted, you will recognize certain elements which have had these extraprofessional interests as their objective. Our undergraduate program in the humanities is one factor. For our graduate students the social and intellectual contacts made possible in the Graduate House, in which relatively mature young men with many special interests are brought together from many parts of the world, are another factor, unfortunately suspended of necessity for the period of the war. A large portion of the program of your undergraduate student activities has been of value in this phase of your development. The Technology Christian Association, the Cilley Library for recreational reading, the notable exhibits in our museums and in our halls, our occasional special lectures, and many other influences have contributed to this liberalizing element in your education.

One other factor, though a bit more on the professional side, deserves comment. I refer to the emphasis which your professional curriculum places on the fundamental sciences of mathematics, physics, and chemistry. You could undoubtedly be trained to go skillfully through the motions of a vocation without such an extensive education in the fundamental sciences. However, this emphasis on the fundamental sciences accomplishes two very important things: The first is that it enables you better to understand the reasons for the processes and procedures followed in your vocation, and the second is that it gives you a background which should enable you to understand and apply new ideas as the techniques of your vocation change.

(*Continued on page 122*)





The House of Many Doors

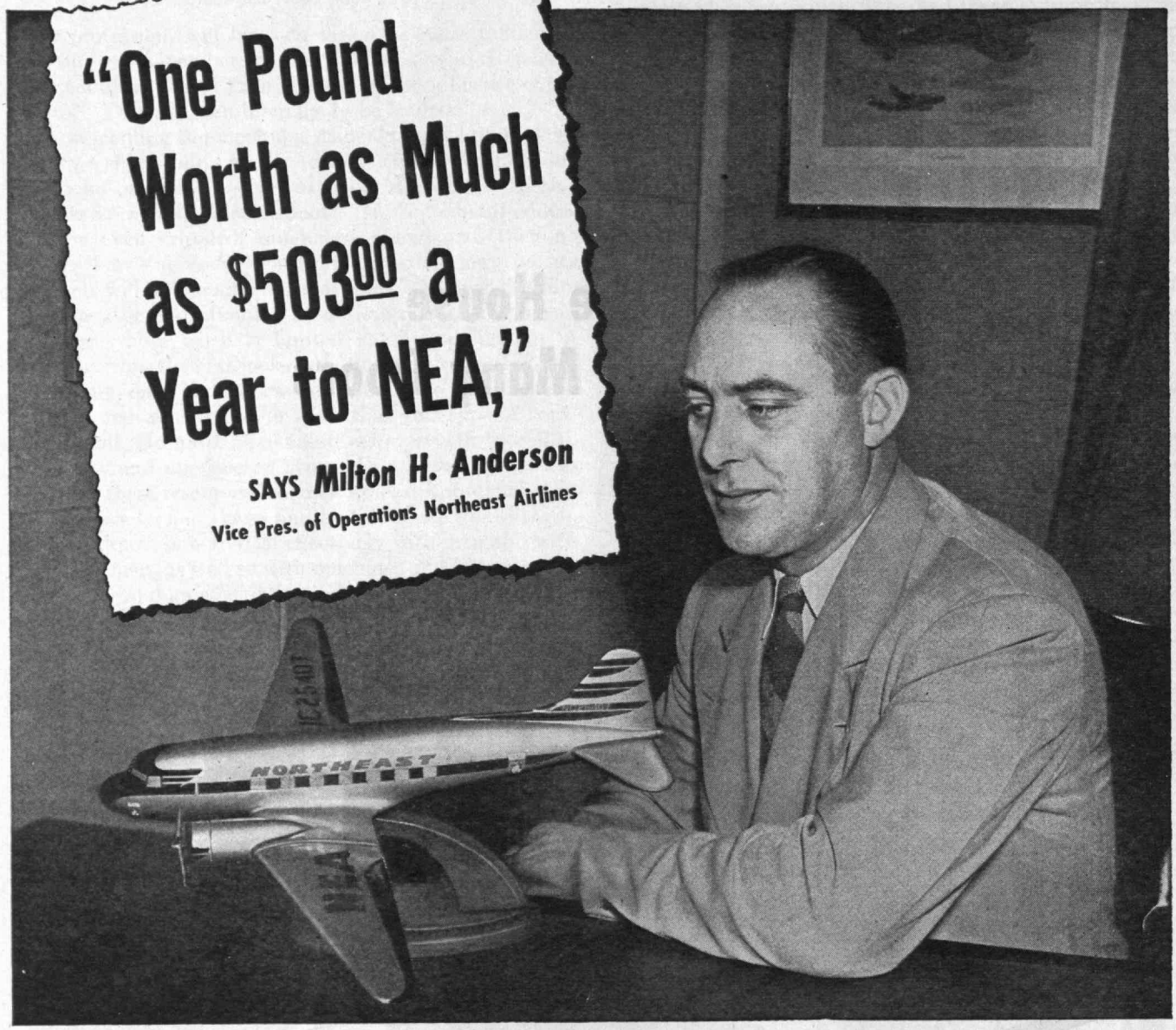
RAYTHEON is truly a house of many doors . . . doors that lead to many research, engineering, and production groups which have made great contributions to the quality and quantity of electronic equipment and receiving and transmitting tubes now helping the armed forces.

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What it means when you

TAKE IT TO TAFT-PEIRCE

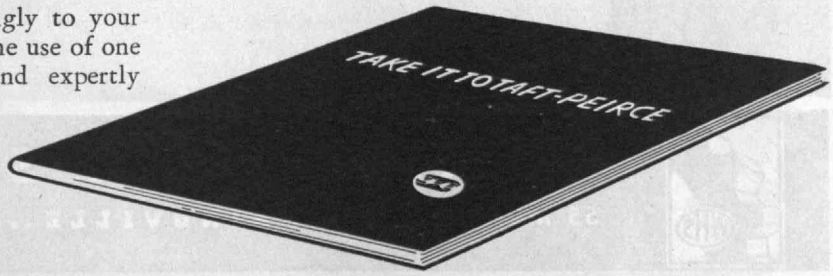


TAKE IT TO TAFT-PEIRCE

For many decades this has been the slogan of Taft-Peirce Contract Service. And this is what that slogan means to anyone in need of assistance *or complete relief from responsibility* in engineering, design, development, tooling, or contract manufacturing:

When you take your problem to Taft-Peirce, it means that you take it to an organization unique in breadth of experience, scope of equipment, and flexibility in plant facilities. It means that you gain the help of engineers and designers who have worked out problems in tooling, machine-building, and product-manufacturing for every industry from aircraft to armaments, from fabrics to foods — men who will work faithfully and exactingly to your requirements. It means that you gain the use of one of the most completely equipped and expertly manned machine shops in existence, the work from which is known *globally* for top precision and fidelity to specifications. And it means that your job can be neither too large nor too small, whether it be a design, a single tool or part, or complete mechanisms and machines in production lots.

That, in brief, is what it means when you *Take It To Taft-Peirce*. And now if you would like to visualize exactly the type of men, machines, and facilities at your service here, you are invited to write to The Taft-Peirce Mfg. Co., Woonsocket, R. I., for this book which is really a 20-minute trip, via pictures and captions, through the Taft-Peirce plant.



PHYSICISTS WANTED

ADDITIONAL physicists are needed in research. Positions are open to persons with undergraduate and graduate college training with or without previous experience.

These opportunities exist in permanent job classifications within the company and offer excellent postwar possibilities in the rapidly expanding field of petroleum research, as well as provide an immediate opportunity of making an essential contribution to the war effort.

The work involves the application of physics to the finding, producing and refining of oil. Various phases of spectroscopy, x-ray diffraction, electron and ion optics, classical mechanics and electricity, communication and electronics are employed in petroleum physics.

Compliance with War Manpower Commission regulations will be required of all applicants. Furnish complete professional and personal data.

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THE TECHNOLOGY REVIEW

Room 7-203, M.I.T. • Cambridge 39, Mass.

TO TRAIN MEN LIBERALLY

(*Continued from page 118*)

This is a very important point. It is not always realized that all of the professions based upon applied science are in a very rapid change of method and content — rapid, that is, when measured in terms of a lifetime. Methods, materials, equipment, and even industries become obsolete and are superseded by fresh ones based on new or more skillfully applied scientific knowledge. It is of utmost importance, therefore, that a man trained to be a leader in his profession have a scientific background which will enable him to keep abreast of and even to lead the way in the evolution and progress of his profession.

All of these thoughts are included in the phrase "To train men liberally to be leaders."

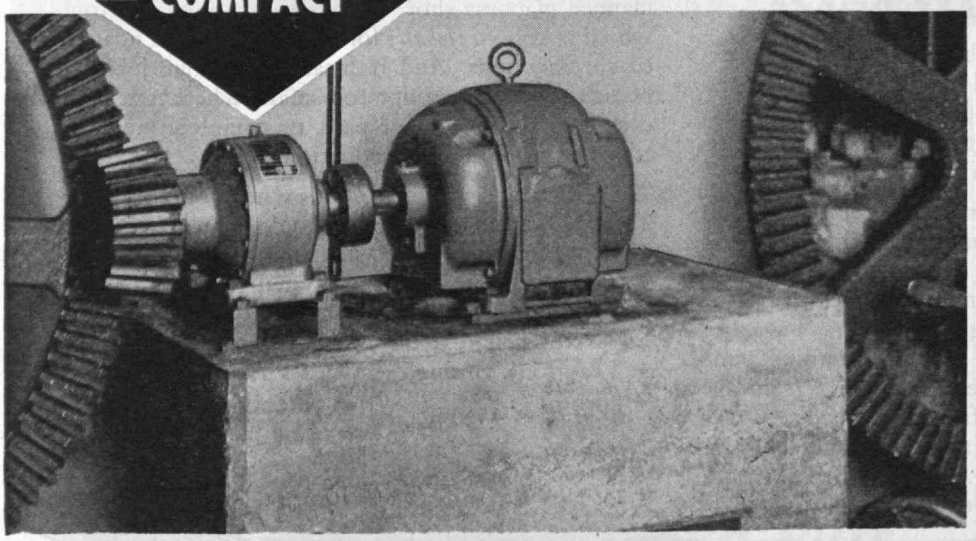
Out of this discussion, which is my final message as head of this institution to you as its students, I hope that you will carry away with you and remember this thought: If you are to realize your own ambitions and live up to the ambitions which we, your teachers, have for you, you must constantly keep in mind the fact that your effectiveness depends not on your vocational skill only, but upon your ability continually to "liberalize" your outlook by expanding your areas of interest, information, and imagination. Part of the value of your education has been to assist you in learning how to do this. From now on, however, you will not be guided or spurred on by classroom assignments of professors; you will be very largely on your own. You will, however, have many opportunities which are yours with little effort. You will almost cer-

(*Concluded on page 124*)

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WHS PATENTED DIFFERENTIAL SPEED REDUCER

. . . and economical, too!



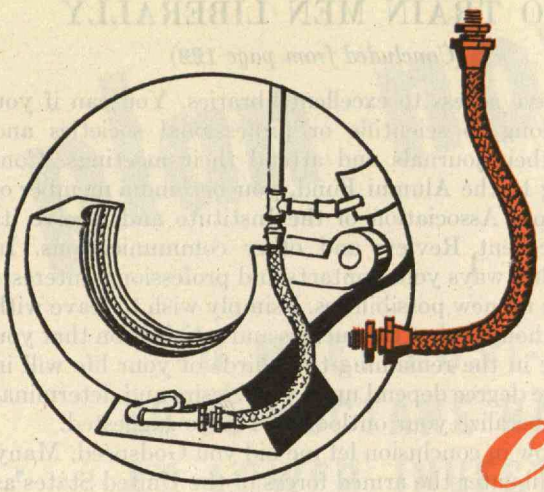
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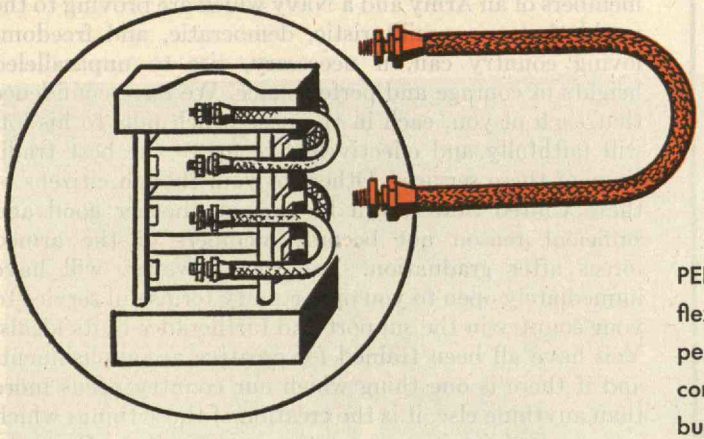
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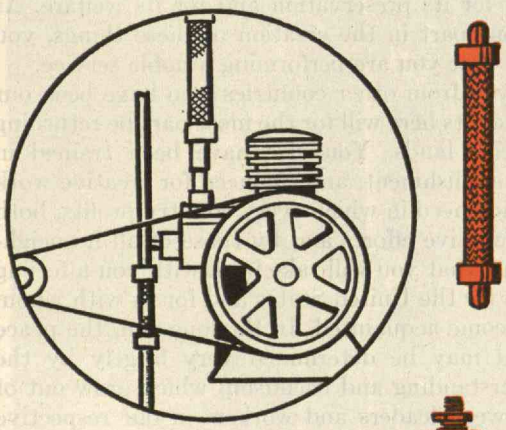
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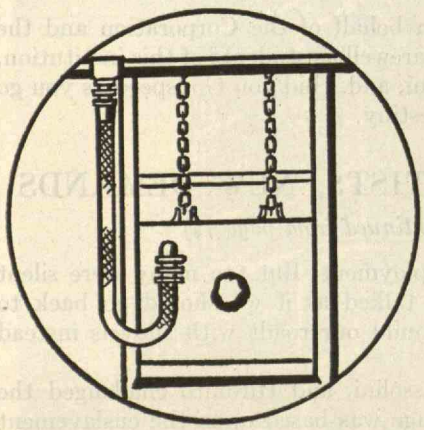
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TO TRAIN MEN LIBERALLY

(*Concluded from page 122*)

tainly have access to excellent libraries. You can if you wish belong to scientific or professional societies and receive their journals and attend their meetings. Contributing to the Alumni Fund, you become a member of the Alumni Association of the Institute and receive its very excellent Review and other communications. In many other ways your contacts and professional interests will open up new possibilities. I simply wish to leave with you the thought that the success and satisfaction that you will have in the remaining two-thirds of your life will in very large degree depend upon your desire and determination to liberalize your outlook as I have suggested.

And now in conclusion let me bid you Godspeed. Many of you will enter the armed forces of the United States as members of an Army and a Navy which are proving to the world that a nonmilitaristic, democratic, and freedom-loving country can, if necessary, rise to unparalleled heights of courage and performance. We have confidence that each of you, each in the post which falls to his lot, will faithfully and effectively live up to the best traditions of these services. Others of you, though citizens of these United States, will for one or another good and sufficient reason not become members of the armed forces after graduation. You too, however, will have immediately open to you opportunity for useful service to your country in the support and furtherance of its ideals. You have all been trained for creative accomplishment, and if there is one thing which our country needs more than anything else, it is the creation of those things which are required for its preservation and for its welfare. As you take your part in the creation of these things, you also can feel that you are performing a noble service.

Those of you from other countries who have been our guests as students here will for the most part be returning to your native lands. You also have been trained in creative accomplishment, and the need for creative work is a world-wide need in which every country profits, both by its own creative efforts and by those of all its neighbors. We trust that you will take back with you a feeling of friendship for the United States and for us with whom you have become acquainted. In the long run, the peace of the world may be determined very largely by the mutual understanding and friendship which grow out of contacts between leaders and workers in our respective countries.

To all of you, on behalf of the Corporation and the Faculty, I bid you farewell as students of this institution, I greet you as alumni, and I bid you Godspeed as you go forth, each to his destiny.

FOR SCIENTISTS, NEW DEMANDS

(*Continued from page 94*)

technological unemployment. But too many were silent while many others talked as if we should go back to manual labor and build our roads with shovels instead of bulldozers.

Then Hitler, Mussolini, and Hirohito challenged the world. Their challenge was based upon the enslavement of their own people, the suppression of free speech, and the use of science and technology to build what they

(*Continued on page 128*)

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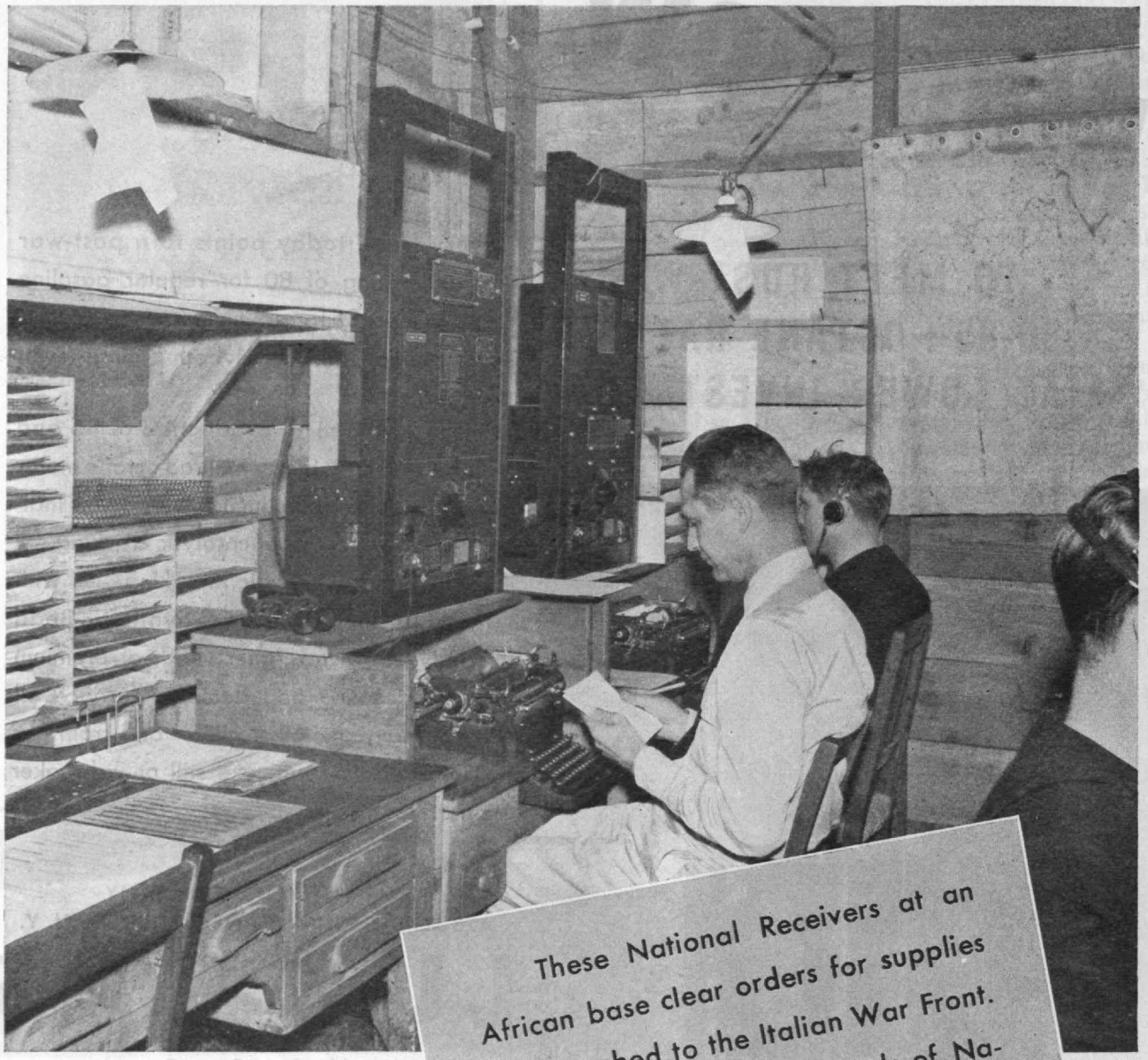


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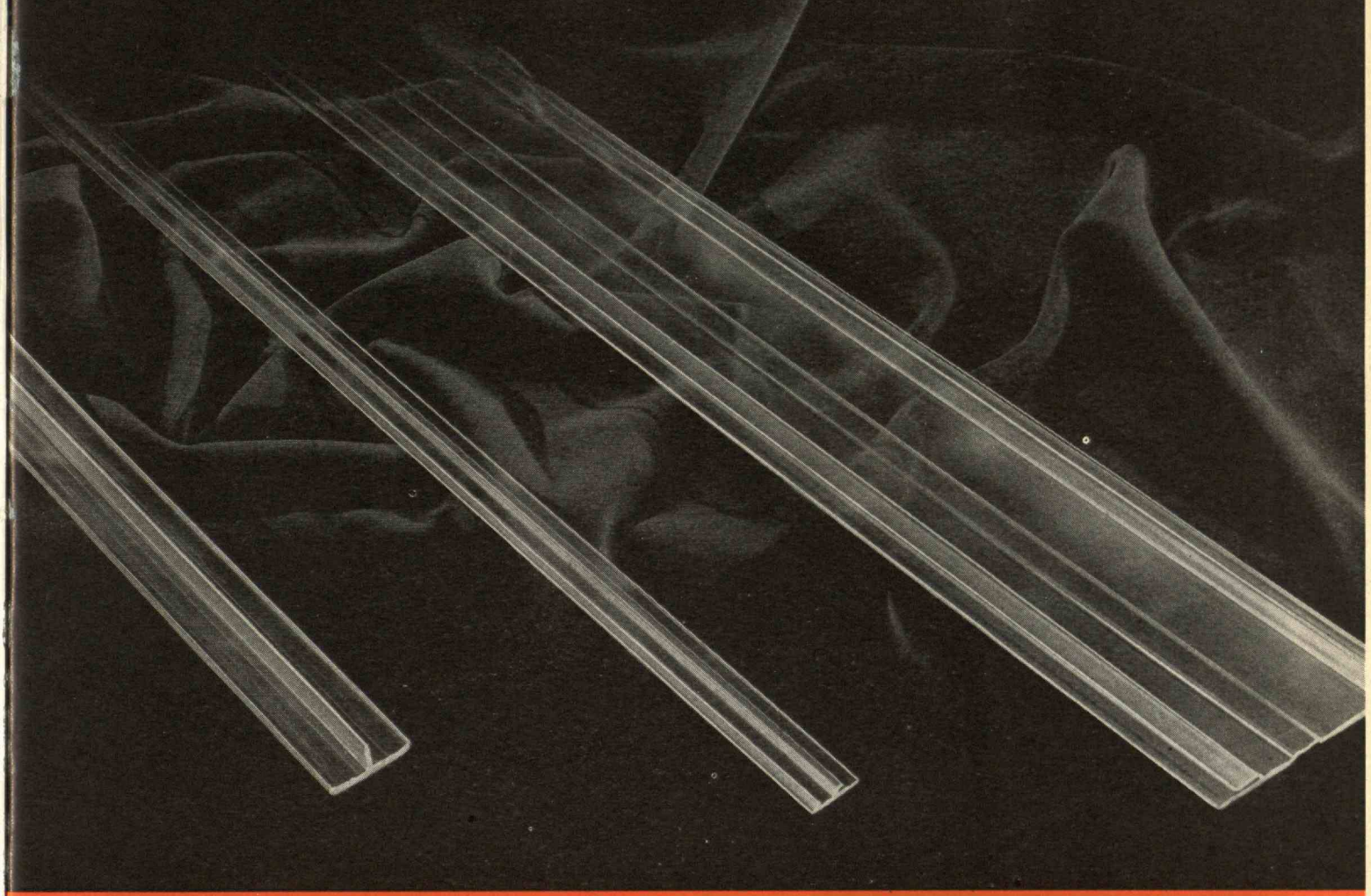


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FOR SCIENTISTS, NEW DEMANDS

(*Continued from page 124*)

thought were invincible war machines. You have seen the United States accept the challenge and, using its own laboratories, engineers, and industry, build almost overnight the arsenal of democracy which turned out not only more of the standard weapons and supplies needed for war but also new weapons which have already determined the success of many of the decisive battles of this war.

You have seen what happened when the Japs thought that they had finished us off by capturing 95 per cent of our supplies of plantation rubber. If it were not for organized research working as part of a team with the engineers and executives of large rubber, chemical, petroleum, and engineering companies, they *would* have finished us off. But these men took hold; carrying out a program set by the Baruch Committee, of which Dr. Compton was a member, they built and put into operation in only a little over two years a synthetic rubber industry which is now turning out one-half again as much rubber as this country used in any pre-war year.

What does all this mean to you who are being graduated today as scientists and engineers? To many it means this: You have been taught how to think. You have been taught to observe facts; to reason from them to a conclusion; to know that a problem well stated is a problem half solved but that no solution which is not based upon sound data is worth recording. Where and how does the country need such a training? Everywhere. What better training is possible for a fighting man or a leader of fighting men? And for those who for one reason or another are deprived of the privilege of fighting, this is a training which, in these days of man- and woman-power shortage, lets any of you aspire to a position that a few years ago was not open to even the top man in the Class. After the war, all with such a training will be needed to win the peace.

If this country can have the faith in the future which it has had in its ability to fight and to lick the greatest war machines that had ever been created and, at the same time, to supply not only its own armies but those of its allies, it will certainly find a way to win the peace. This will not be easy, however. To my mind, the men who are destined to play a big part in this hard task are going to be scientists and engineers. But they are going to be more. They are going to be those who can win to leadership, who understand their fellow men as well as the fundamentals of sound economics. They are going to be those who think about the meaning of daily occurrences and current events and who think deeply enough so that their very thinking molds their characters and makes them more potent influences in their communities.

The production man of the future will be drawn more and more from among engineers, chemists, and scientists. But the truly successful production man will be only the one who appreciates the human values of those who work and who gives workers their rights, not because they demand them but because they are fellow human beings working in a partnership. He will be the man who knows the wisdom of honest, fair dealing and who knows that happy workers, working for a fair, outspoken leader who understands their problems, will work better and de-

(*Concluded on page 130*)

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Tygon Paint may be applied to wood, metal or concrete; may be air dried, or baked. Formulations include black, white, clear, as well as a wide range of colors.

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FOR SCIENTISTS, NEW DEMANDS

(*Concluded from page 128*)

velop further than those who work in an atmosphere of niggling suspicion.

Millions of men will come back from the Army with their characters strengthened by a sublime faith in their fellow man. Others will come back ruined by a conviction that they have been picked upon, that all is wrong, and that nothing can be obtained except by force. The waste of war will have ruined their character and they will be unable to reason that it is up to all of us to buckle down and build a better world and to find ways by which the standards of living of all will be high enough so that more and bigger wars need not come.

The postwar readjustment will need men and women who are trained to observe, to reason, to think, and to reach the right conclusions and to do all this openly and fearlessly in such a way that others will know how they think, what they think, and why they act as they do. It is for this reason that I urge every one of you to read the newspapers and news weeklies, to listen to the radio commentators, to think about all that is going on around you, to discuss these with your fellow man, and to prepare to play a part in the world about you.

If you go into the Army or the Navy, grasp the opportunity to find out what the fellows around you think about things and why they think as they do. Try to understand how and why a small vocal minority, once it is organized and capably directed, can lead astray large groups — in the case of Italy and Germany, even large nations. Find out how to say "no" when "no" must be said, and how to say it in such a way as to leave no rancor. Find out how to present your case persuasively. Find out how to make friends of those who think differently from you without subordinating yourself to them or their ideals. Find out how to present your case to an impartial arbiter and to accept his decision whether for or against you. Yes, learn how to change your mind and maintain your dignity or, better still, "save your face."

Surely great rewards — spiritual as well as material — will come to those who lead in the winning of the peace. But the competition will be terrific. You should not get any idea that because there is a great clamor for you now, you can take it easy. You are going to be in competition with men who spent five years in the Army or Navy and who have set their teeth to make up those five years, men who have proved themselves in battle, men who do not know the meaning of quitting time or quitting. You are going to be competing with men who have played a part in the great production battle that has built up the arsenal of democracy. All this will make it hard.

But you are going out into a world that has learned to recognize the value of scientists and engineers. You are going out into a world which has learned what scientists and engineers can do — that they can produce and that the best of them can lead as no others can lead. Prepare yourself for this leadership and enter with all your heart and soul into the winning of the peace which will defend for years to come the country for which we have been and are fighting. Do not be afraid to exercise the privilege of free speech for which we are fighting. But, above all, before you talk — observe, reason, think, and draw conclusions from your observations and thinking.



OWI Photo by Palmer, in an Allegheny Ludlum plant

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ALL of us, men or women—on the job or off it—are people with a mission these days. The war makes common cause for every one and spares no one.

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Boiled down to a very few words that simply means: *no waste—everybody help.* It means, in terms of your everyday life, using everything wisely to secure the most wear; reducing expenditures to a minimum; saving materials; buying War Bonds and stamps to the limit.

It also points up a responsibility that falls upon you as one of the next generation of business men and technicians. War is the ultimate waster of men and materials, but it brings about enormous technical progress and development. That has been very true in the special steel fields. It will be yours to translate these advances into terms of better living.

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RAILROAD COMFORT

(*References concluded from page 103*)

[3] *The Story of Pullman*, 1893.

[4] *The Americanization of Edward Bok* (New York, 1921), p. 251.

[5] United States Patent 42,182, Field and Pullman, April 5, 1864.

[6] United States Patent 49,992, Field and Pullman, Sleeping Car, September 19, 1865.

[7] Theodore T. Woodruff, the leading inventor of convertible furniture for the sleeping car, and Webster Wagner (1817–1882), who worked under Vanderbilt's patronage and is credited with the introduction of the drawing-room car and the invention of the oval car-roof.

[8] "A Pioneer's Centennial" (Chicago, 1931), p. 9.

[9] The *Illinois Journal*, May 30, 1865, quoted *in extenso* in Joseph Husband, *The Story of the Pullman Car* (Chicago, 1917), pp. 45–46.

[10] Compagnie de Chemin de Fer de Paris à Orléans, *Wagons composant le train impérial offert à Ll. Maj. l'Empereur et l'Impératrice* (Paris, 1857).

[11] Charles Dickens, *American Notes for General Circulation*, chap. iv.

[12] *L'Illustration*, XXXI: 215 (April 3, 1858).

[13] L. Xavier Eyma, "Souvenirs d'un voyage aux Etats-Unis en 1847," *L'Illustration*, XI: 316 f. (July 22, 1848).

[14] In "Sketches from Memory" from *Mosses from an Old Manse* (New York, 1846).

[15] United States Patent 11,699, Henry B. Myer, September 19, 1854.

[16] British Patent 587, October 30, 1852.

[17] United States Patent 21,352, August 31, 1858.

[18] British Patent 2,005, August 7, 1794.

[19] United States Patents 16,159 and 16,160, December 2, 1856. Today's solution is embodied in the second of these.

[20] In subsequent patents, Woodruff retained the idea of the folding bed — cf. United States Patent 24,257, May 31, 1859. He even complicated it into a double-folding "elevated couch" for the accommodation of two sleepers.

[21] Charles S. Sweet, "Sketch of the Evolution of the Pullman Car" (1923), in manuscript, p. 116. Through the courtesy of the Pullman Company, Chicago, we had access to this manuscript, the most objective and solidly documented record of the subject. It considers the sleeping-car bed but not the convertible seat. It is especially concerned with all technical details of the Pullman car: brakes, wheels, heating, water, lighting, and so on.

[22] *Ibid.*, pp. 123–124.

FORECASTING FOR MARS

(*Continued from page 93*)

called "surface maps," contain weather data obtained at or near the earth's surface. They include observations of pressure, pressure change, temperature, humidity, cloud types, cloud amounts, cloud heights, visibility, wind direction, wind velocity, and the state of the sky. The information is observed simultaneously at land stations, on ships, and by low-flying aircraft. Every six hours a large weather station ordinarily prepares a surface map which covers approximately half the Northern Hemisphere. At more frequent intervals other charts are plotted for smaller areas. As further information is received concerning the state of the atmosphere above the earth's surface, it is plotted on another set of maps, called "upper air charts." These charts are usually plotted for different levels in the atmosphere, say 10,000 feet, 20,000 feet, and 30,000 feet. They include data on air temperature, pressure, humidity, and wind which have been obtained by means of radio instruments or special aircraft flights. Besides these upper air charts, numerous auxiliary charts indicate moisture layers and regions of stability or instability. Reconnaissance planes are another source of weather information since they give reports over regions where surface observations are lacking — for example, over the ocean and over enemy territory.

Each chart is carefully analyzed, and on this evidence the small forecast group arrive at a picture of the future weather. When a large mission is planned, the forecast of one station must be discussed with other weather units since a combined air operation requires close agreement between the forecasting sections of each component

(*Concluded on page 134*)

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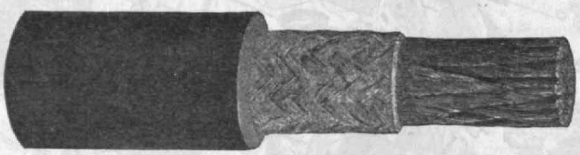
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FORECASTING FOR MARS

(*Concluded from page 132*)

of the Air Forces. Thus a weather forecast for the Saint-Lô mission involved numerous groups of forecasters.

For a number of days prior to July 25, England and northwestern France were dominated by a mass of air which was particularly moist in the lowest 6,000 feet. In view of this regime, the forecast called for generally overcast skies with clouds persisting throughout the day over the Saint-Lô area. The bases of these clouds were too low to allow bomber operations. After several cloudy days a gradual change in the air flow was noted. Since this change meant an inflow of drier air, the forecasters predicted that there would be practically no low clouds over Saint-Lô on the following day, July 25. At the same time all bases would be operational in the morning, and the weather en route to the target would be clear. The only unfavorable feature was the likelihood of haze, which would decrease the visibility. The prediction, therefore, indicated poor visibility in the early morning, with a gradual improvement after sunrise. On the basis of the weather outlook and the requirements of the ground force commanders, the mission was scheduled for late in the morning of July 25.

Early that morning active pressure changes were noted on the 2:00 A.M. chart. On occasions the weather situation changes so rapidly that the forecaster cannot predict the new development more than a few hours ahead. This time, however, the pressure variations indicated the rapid development of a thunderstorm situation which would not give low clouds over northwestern France before evening. The target time had been well chosen. The immense force of bombers and fighters was over the target for more than two hours, commencing around 10:00 A.M. At no time were the clouds below 10,000 feet. In the evening and throughout the following day, low clouds were again present, and restricted air activity. The period of operational weather was of short duration, but it was sufficient.

Besides illustrating the role played by the weather forecaster, the case history of the Saint-Lô bombing also suggests advances that are being made in the science of meteorology: First, at no time in the past has there been such a close study of atmospheric phenomena as is being made in the weather stations of the combat theaters. The forecasters have access to detailed information of cloud types, and as a result they are gaining valuable evidence concerning the intricacies of the weather. Second, the growth of the weather services has been tremendous; today thousands of young scientists are practicing meteorology. We may therefore anticipate that this expansion will produce many research workers who will contribute to the development of more precise forecast methods. Third, some outstanding developments have been made in procedures for obtaining meteorological observations. The new techniques have added considerably to our knowledge of the atmosphere. Finally, the global extent of this war has resulted in the location of weather stations in regions where meteorological information was previously very inadequate. These stations have furnished valuable data which aid in the understanding of the general circulation of the atmosphere.

It is hence logical to expect that this war will bring about the perfection of new forecast techniques. As it does, it will be no exception to the record of history.

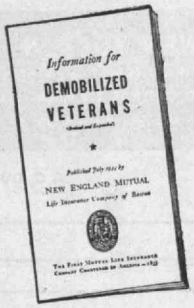
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THE TREND OF AFFAIRS

(*Continued from page 91*)

of a cathode-ray tube, was announced by I. G. Maloff and D. W. Epstein of the Radio Corporation of America. An important part of this paper dealt with means for molding the necessary corrective lenses from transparent plastics, thereby overcoming the prohibitive costs of glass lenses produced in the usual manner by grinding and polishing. The technical and economic factors of radio relay stations which make possible the interconnection of ultrahigh-frequency stations into a communication system were discussed by C. W. Hansell of the Radio Corporation of America, who recommended that such stations, which will probably be unattended, be spaced 35 to 45 miles apart for most economical operation.

An improved circuit for frequency-modulated superheterodyne receivers, making possible increased stability and selectivity of the receiver, was described by G. L. Beers, also of the Radio Corporation of America.

New principles of construction of electron tubes, especially for operation at very high frequencies, were enumerated by E. F. Peterson and E. D. McArthur of the General Electric Company in their description of the "lighthouse" tube.

F. A. Firestone of the University of Michigan announced the development of the supersonic reflectoscope, a device in which pulses of ultrasonic sound waves are used to determine the thickness of metallic objects as well as to disclose flaws in metals and detect discontinuities in bonds between metals. A discussion of the applications of the mass spectrometer to the needs of the petroleum and chemical industries was given by J. A. Hipple, who is with the Westinghouse Electric and Manufacturing Company.

New types of resonant electrical circuits suitable for use at high frequencies were described by Donald B. Sinclair. A graduate of Technology in 1932, Dr. Sinclair is associated with the General Radio Company.

A two-million-volt mobile industrial x-ray unit was announced for the first time and described by E. E. Charlton and W. F. Westendorp of the General Electric Company. This unit makes possible the examination of much larger metallic objects than can be examined with the million-volt unit; and it may be used to reduce the exposure time to about 1/80 of that required for the same object with the previously used million-volt unit.

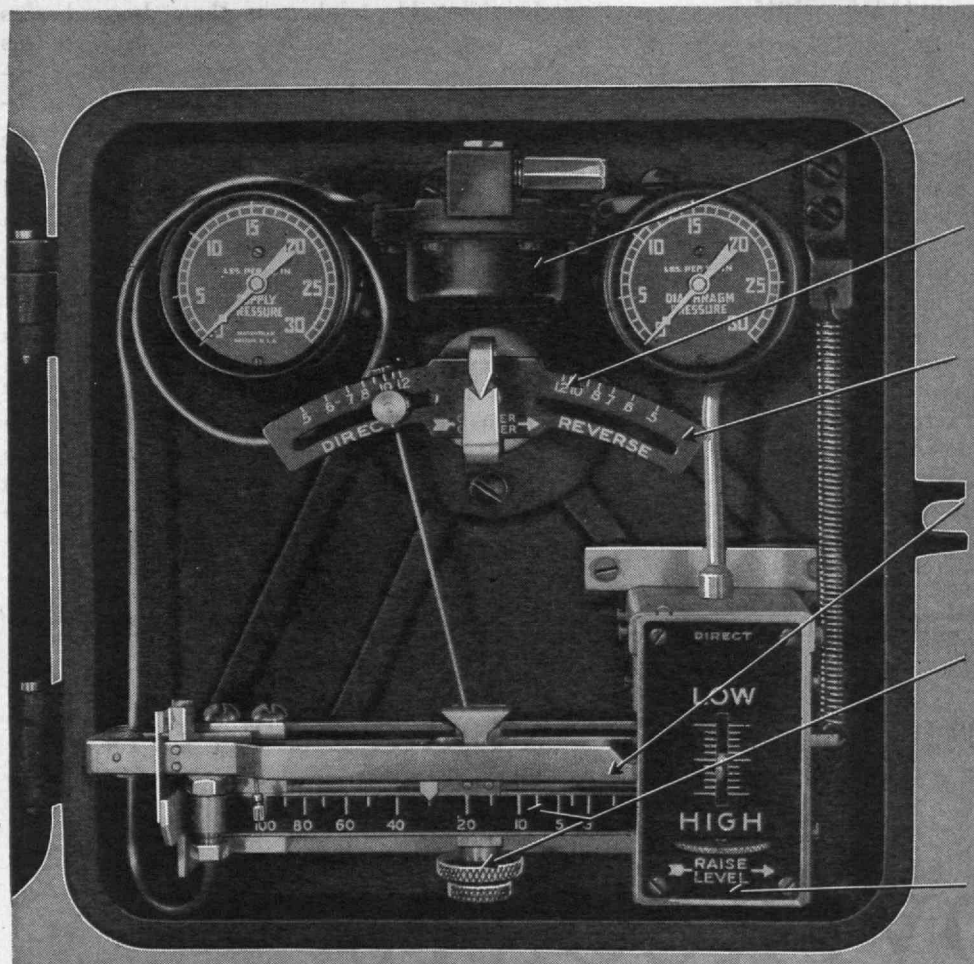
Many of the other papers dealt with scientific or engineering principles rather than electronic equipment. In this classification may be mentioned the paper on the beginnings of nuclear physics, by Karl K. Darrow of the Bell Telephone Laboratories; the paper on micro-wave oscillation generators, by E. U. Condon of the Westinghouse Electric and Manufacturing Company; and the paper on the equivalent circuit of electron tubes at ultra-high frequencies, by F. B. Llewellyn and L. C. Peterson of the Bell Telephone Laboratories.

It is, perhaps, too early to determine with precision the full significance of the first National Electronics Conference. The conference was pre-eminently successful in bringing together large and important groups working in divergent fields, for a free discussion of the way in which

(*Continued on page 138*)

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THE TREND OF AFFAIRS

(*Continued from page 136*)

electronics could help each of them. As such the conference fulfilled a need not supplied by any other existing body. It is also apparent that the conference had a pronounced effect in stimulating the thinking of technical workers on the value of electronics in peacetime developments as well as in wartime developments. The success of the first National Electronics Conference has led to plans for a second conference in Chicago in October, 1945.

Colorful Bacteria

PEOPLE are blonds, brunets, or carrottops; bacteria are gram-negative, gram-positive, or gram-amphophile. This distinction refers to how the micro-organisms behave under the gram stain, which the investigator determines by subjecting bacteria to a basic triphenylmethane dye such as crystal violet, then mordanting the stained bacteria with iodine, and finally flushing with alcohol or acetone. Gram-negative organisms release the stain to these solvents and become decolorized; gram-positive ones retain the dye; gram-amphophile organisms show local variability in release or retention of the stain.

The gram stain has nothing to do with the metric unit of mass. Its name, although often written with a lower-case initial letter, honors Hans Christian Joachim Gram, the Dane who in 1884 came on this procedure while searching for a method to stain bacteria in tissues.

As a differential characteristic, the gram stain is much more useful to the bacteriologist than hair color is to the anthropologist because, for one thing, the gram behavior of any species is constant under fixed conditions of age and cultivation. Furthermore, the gram stain correlates to a high degree with other bacterial characteristics. For instance, as diligent newspaper readers learned when penicillin first made the front pages, this antibiotic is effective mainly against gram-positive bacteria; the only gram-negative pathogens against which it is active are the organisms causing gonorrhea and infectious meningitis. Similarly, cultures of gram-positive organisms are strongly inhibited by triphenylmethane dyes, whereas gram-negative species are much less susceptible in this respect. Most of the sporeforming organisms (those producing resistant spores to survive temporarily adverse environments) and most of the acid-fast bacteria (those, such as the bacterium of tuberculosis, which resist staining unless dyes are applied hot) are gram-positive. And so on for a list of over 20 differential characteristics which correlate with the gram stain. Like all correlations existing between biological phenomena, this one is not absolute but is readily demonstrated statistically.

What is the nature of the gram stain? In the 60 years since its discovery, total agreement on this has never been reached. Is the gram stain chemical in mechanism, as if micro-organisms had differing chemical affinities for the dyes used? Is it physical in nature, as might be the case if cell membranes of gram-positive species allowed ingress of the water-soluble dye but prevented escape of the dye-iodine complex formed by mordanting? Or is it de-

(*Concluded on page 140*)

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THE TREND OF AFFAIRS

(*Concluded from page 138*)

pendent upon a combination of physical and chemical factors? More than a single mechanism may in fact underlie the gram-staining nature of bacteria. Such a possibility would rationalize exceptions to correlations between the gram stain and other characteristics.

A recently advanced hypothesis which accords with most of the recognized facts about the gram stain suggests that all micro-organisms have a gram-negative cell body which, in the gram-positive types, is surrounded by an outer layer of ribonucleic acid. This substance is one of two known forms of nucleic acid and is commonly derived from yeast. Such an outer layer, it is postulated, would confer ability to retain the gram stain. The proponents of this theory treated certain gram-positive forms with the enzyme ribonuclease, which would remove a ribonucleic acid coating. Organisms so treated became gram-negative.

Thus one more step has been taken in the slow advance toward ultimate knowledge of the gram stain's fundamental mechanisms. But even though nothing were known of its nature, the gram stain would still be one of the most valuable tools of the bacteriologist.

THE INSTITUTE GAZETTE

(*Continued from page 110*)

Army Specialized Training Program at the Institute was terminated last March, and the only Army students here now are officers in highly specialized technical work. One of the Institute's major war training activities is the operation of the Harbor Building School for both Army and Navy officers. This school, not previously explicitly reported, is a self-contained unit directed by Professor Carlton E. Tucker, '18, of the Department of Electrical Engineering, with a teaching and operating staff of over 250. We are continuing meteorological training for the Navy but have completed the excellent Army program in this field. All told, we prepared over 800 meteorological officers for the Army Air Forces.

"These war training programs, together with our continuing civilian training, were carried on despite the fact that 172 members of our regular permanent staff were engaged full- or part-time on government war work, 100 of these being stationed away from the Institute."

Enrollment. "During the year, the number of civilian students decreased to 1,271, a reduction of over 50 per cent of our normal registration. Compensating partially for the decrease in civilian registration were 972 service trainees, including 902 Navy V-12 students. As of July 13, our total student body numbered 2,243, which is about two-thirds normal. In 1944, for the first time in many years, the first-year class entered at two separate dates: 106 on March 6 and 478 on July 10. The two groups gave us a normal-sized freshman class.

"Dean Lobdell, '17, has prepared a detailed history of alterations in our war enrollment, of the effects of Selec-

(*Concluded on page 142*)

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THE INSTITUTE GAZETTE

(*Concluded from page 140*)

tive Service changes, and of our undergraduate training programs for the services. This interesting account should be of great value in appraising the national policy with respect to college students during the war."

With the Council

FOR its 240th meeting, the first for the present academic year, the Alumni Council assembled on the last Monday of October in newly redecorated Pritchett Hall of Walker Memorial, with 104 members and guests in attendance. Raymond Stevens, '17, President of the Alumni Association, calling the meeting to order in good season for the large volume of business scheduled, summarized alumni affairs as events since the preceding meeting in May had affected them, and outlined the present status and functions of the Association and the Council. Introductions of new members and of guests followed.

Business of the meeting included a number of reports: Tentative recommendations have been made to the executive committee concerning scope and methods for a volume to present the record of Alumni in World War II; various resignations and replacements of Council members were noted by Frederick Bernard, '17, chairman of the committee to nominate representatives of local associations; Josiah D. Crosby, '21, was elected on recommendation of the executive committee as chairman of Alumni Day, which has been tentatively scheduled for June 23, 1945; the Alumni Fund, as reported by Director Henry B. Kane, '24, stood at $107,783.62, with 8,271 contributors, the two totals being respectively $16,000 and about 800 men ahead of the figures for last year at the same time; the release of several subcommittees by the committee on increased activities of the Alumni Council was reported by A. K. Berle, '27, chairman.

A silent rising vote accepted resolutions in memory of Charles F. Park, '92, Frederic H. Fay, '93, and Lawrence Allen, '07, which were presented respectively by Charles E. Fuller, '92, chairman of a committee including Arthur L. Townsend, '13, and John A. Lunn, '17; by Joseph W. Wattles, 3d, '08, for a committee comprising also Charles B. Breed, '97, chairman, and Frederic H. Keyes, '93; and by Donald G. Robbins, '07, for a committee which included also Gardner S. Gould, '07, and Leicester F. Hamilton, '14.

Retiring this year as a term member of the Institute Corporation after 11 years' service in that capacity, H. B. Richmond, '14, upon request by President Stevens for remarks about such service, commented upon the way in which alumni term members share in all activities of the Corporation, and upon the combination of circumstances which had contributed to his lengthy period as a term member. Proposal for a change in the bylaws, whereby the President of the Alumni Association should be elected a year ahead of the date of taking office and as president-elect should be expected to attend meetings of the Alumni Council and the executive committee, was tabled after considerable discussion. The notice of amendment had been sent to Council members in advance, as provided by the bylaws, and phraseology had been amended by the executive committee. Professor C. Frank Allen, '72, spoke at some length on the over-all aspects of the proposed change. Further discussion on the tabled motion is expected at subsequent meetings of the Council.

As speaker of the evening, President Compton reviewed the situation of the Institute, analyzing probable postwar problems to be expected as a consequence of the fact that students from foreign lands are coming to be so large a proportion of the Institute population. Under present wartime conditions, foreign students constitute 20 per cent of the enrollment. Increased enrollment after the war may be made possible by enhanced facilities, 700 freshmen and 800 graduate students being looked to as part of a total enrollment stabilized at 3,600. The student housing problem discussed in his annual report was considered by Dr. Compton among the various highlights of the general Institute picture which he presented to the Council.

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Book Review

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In the first place, the book shows a couple of interesting totals. At the moment (the moment being mid-November) 8,400 of you have contributed $110,000. Those are both very encouraging figures. They encourage us to think that we may really hit those goals of ours this year. Only 1,600 more contributors will make the 10,000 mark, and $40,000 more will get us up to that $150,000 total we're shooting for. When we do that, the Fund will really have come of age.

Most of you who see this page have already contributed. To you, our hearty thanks for your part in making the book look good so far. However, 1,700 of you who contributed last year are not yet in. We've sent along the November and now the December Review because we hope it's nothing more than oversight on your part. We trust that this reminder will act as a memory-jogger and that we shall again be able to count you in. We know the Institute needs the same active support you have given in the past; we think you want to continue to receive The Review.

Into the Stretch

IT LOOKS at first glance as though the Club Sweepstakes winner were in the bag. Since last month there has been no change in the order of the leaders. The pace has quickened, but Pittsburgh's still out in front of Providence by the proverbial nose. Newark, however, has crept up into third place, and the first four are closely bunched. Don't be at all sure that one of those entrants running in the rear won't pull up before long!

Right now, then, here's the way it looks:

	Per cent of Contributors *	*Average Contribution*
Pittsburgh	64	$16.00
Providence	59	14.30
Newark	53	14.20
Philadelphia	51	18.00
Cincinnati	38	11.10
Buffalo	34	15.00
Harrisburg	33	11.00
Chicago	31	14.90
Kansas City	28	42.00
Dallas	24	10.70
Alumni body as a whole	25.5	$13.10

* Based on number of active members.

TECHNOLOGY MEN IN ACTION

M.I.T. MEN AT WAR

Up to November 9 over 6,398 Institute Alumni, including 28 Admirals, 1 Commodore, and 74 Generals, were recorded as being in the active naval or military services of the United Nations. The new addition this month is Rear Adm. Robert W. Hayler '20. There were 107 Alumni who had already been decorated, and 77 Alumni who had made the supreme sacrifice.

Additions and corrections to the listings which have previously appeared, beginning two years ago with the issue of November 1942, will continue to be published in future issues of The Review. As a matter of convenience, promotions and corrections in the rank previously given are grouped under a single heading, "Changes in Rank." The Review Editors are greatly indebted to the many Alumni and other readers who are continuing to co-operate so helpfully in reporting inevitable errors of omission and commission which they note in these listings.

NEW DECORATIONS

1902 McCarthy, Charles, *Col.*, U.S.A., Legion of Merit.
1920 Hayler, Robert W., *Rear Adm.*, U.S.N., Navy Cross; Gold Star.
1922 **Acker, Lewis F., *Col.*, U.S.A., Silver Star; Purple Heart.
Kitts, Willard A., *Rear Adm.*, U.S.N., Navy Cross; Legion of Merit.
1927 Williams, Milo R., *Capt.*, U.S.N., National Order of the Southern Cross, awarded by Brazilian government.
1929 Miller, Harry W., *Lt. Col.*, U.S.A., Legion of Merit; Silver Star; Bronze Star.
1933 Ragsdale, Edmund M., *Comdr.*, U.S.N., Legion of Merit.
1938 Dent, Frederick R., Jr., *Col.*, U.S.A., Air Medal and Oak Leaf Cluster; Distinguished Flying Cross.
1940 Dickson, John R. V., *Col.*, U.S.A., Legion of Merit.
1941 Renner, John J., *Capt.*, U.S.A., Bronze Star.
1942 **Crowley, Thomas T., *Maj.*, U.S.A., Purple Heart.
Field, Russel W., Jr., *Lt.*, U.S.A., Air Medal and Oak Leaf Cluster.
**Jones, Jack J., *Capt.*, U.S.A., Air Medal and four Oak Leaf Clusters; Purple Heart.

NEW LISTINGS

U.S.A.

1922 Stewart, Bruce E., *Capt.*
1924 Lloyd, T. Stacey, *Capt.*
1928 Black, George P. W., *1st Lt.*
Newhall, Charles W., Jr., *Lt. Col.*
1931 Page, John, *Capt.*
1932 Gross, George, *Capt.*
Reidell, Alfred G., *Capt.*
1933 Avakian, Arra S., *Maj.*
Bruce, Alfred P., *T.5.*
Travis, Edward F., Jr., *Pfc.*
1934 Daniel, Philip A., *1st Lt.*
Grueter, Paul C. V., *1st Lt.*
Westfall, John W., *Capt.*
1935 Hafer, Thomas W., *Maj.*
Lane, Charles A., *Pvt.*
1936 Rulon, Morgan C., *2nd Lt.*
1937 Gay, Godwin R. F., *Lt.*
Griffiths, Charles N., *2nd Lt.*
Strauten, Robert, *Pvt.*
1938 Fairless, Blaine F., *Lt.*
Heath, Thomas L., *Pvt.*
Taft, Edgar B., *Capt.*
1939 Frankel, David S., *Lt.*
Reynolds, Earl N., *1st Lt.*
1940 Chambers, Ralph M., *Lt.*
Kingsbury, Edward J., Jr., *T.4.*
Lewis, Jean L., *2nd Lt.*
McKee, John M., *2nd Lt.*
Plumley, Frank E., *Pvt.*
1941 Atkins, John N., Jr., *Maj.*
Pofcher, Harvey I., *Sgt.*
Simon, Robert H., *Pvt.*
1942 Goldstein, Allen M., *T.5.*
Gomez, Paul C., *Pvt.*
Hendrick, William M., *Pvt.*
Taylor, John R., *Lt.*
1943 Feuerring, Rafael R., *Pvt.*
Kent, Thomas J., Jr., *Pvt.*
McWilliams, Frederick F., *Pfc.*
Mattes, Howard L., *1st Lt.*
2–44 Dolezel, Edward J., *2nd Lt.*
Epstein, Marvin P., *Sgt.*
Evans, Willie B., *Lt.*
Holbrook, Stanley E., *Pvt.*
Howard, Warren H., *2nd Lt.*
Jacobson, Woodrow R., *Lt.*
McCutcheon, Keith B., *Lt. Col.*
Mathews, Warren E., *Pvt.*
Muriph, Arthur J., *T.5.*
Rockcastle, Verne N., *Lt.*
Rose, Alan C., *Pvt.*
2–44 Spohn, Clifford A., *2nd Lt.*
Yehle, Eugene C., *Lt.*
10–44 Wong, Arthur C., *2nd Lt.*
1946 Gaviller, Bruce K., *Corp.*
McDonald, William P., *Corp.*
Reeves, Willis W., Jr., *2nd Lt.*

U.S.N.

1914 Lee, Charles S., *Lt. Comdr.*
1917 Putnam, Roger L., *Lt. Comdr.*
1921 Noyes, Edward W., *Lt.*
1922 Keiller, Thomas M., *Lt. Comdr.*
1926 Chidsey, Robert S., *Lt.*
Fort, Marron W., *Lt. (j.g.)*
Hope, Edward S., *Lt.*
1929 Nivling, Lyman E., *Comdr.*
1930 Glass, Richard I., *Aer.M.3c.*
Huson, Amerst E., *Lt. Comdr.*
Wallace, Hugh, *Lt. Comdr.*
1931 Berger, John V., *Lt. (j.g.)*
Pszenny, Joseph J., *Lt.*
Weeks, Francis D., *Lt. Comdr.*
1932 Hough, Louis H., *Capt.*
Lichtenstein, Harold, *Lt. (j.g.)*
1936 Obrig, Jack T., *Lt.*
1938 Dunlop, Dudley M., *Ens.*
Emery, James A., *Lt. (j.g.)*
Mudd, Henry T., *Lt. (j.g.)*
Tiernan, William F., Jr., *Ens.*
1939 Caudill, William C., *C.M.1c.*
Christensen, William, *Ens.*
1940 Edwards, Theodore A., *A.S.*
Lougas, Gilbert A., *Ens.*
Lutz, John O., *Ens.*
1941 Knott, Donald M., *Ens.*
McCuen, Newell H., *S.2c.*
1942 Boyd, Edward A., *Ens.*
Tonkin, Henry M., Jr., *Ens.*
1943 Gardiner, Frank J., *A.S.*
Gould, Gilbert B., *Ens.*
Kean, Andrew H., Jr., *Ens.*
Kelly, Albert J., Jr., *Ens.*
Lipford, John T., *Ens.*
Post, William G., *Lt. (j.g.)*
Siegel, Sidney, *Ens.*
2–44 Antoniak, Charles, *Lt. Comdr.*
Baker, James L., *Ens.*
Briggs, Chester A., *Comdr.*
Christie, John F.
Dodge, Sherwood H., *Comdr.*
Estes, Robert J., *S.1c.*
Gilliat, Wilson N., *Ens.*
Ilfield, Robert M.
Jefferson, Edward, 2d, *Mid.*
Kenna, William E., *Comdr.*
Leone, Peter F., *Mid.*
Littleford, John W., Jr., *S.1c.*
Mackert, Edwin R.
Paddock, Alton E., *Comdr.*
Schwartz, Robert A. D., *Ens.*
Sherby, Sydney S., *Comdr.*
Slason, Frank K., *Comdr.*
Stearns, Thornton, *Ens.*
Weldon, Albert R., *Lt. Comdr.*
Zarlengo, Arthur W., *S.1c.*

U.S.M.C.

1936 Cross, H. Page, *Capt.*
1940 Green, Milton, *Pvt.*
1941 Dilts, Howard S., *1st Lt.*

CANADA

Army

1924 Massey, Denton, *Gr. Capt.*

FRANCE

Navy

2–44 Cauvin, Gerald A., *Ens.*

CHANGES IN RANK

U.S.A.

1913 VanDeusen, Donald H., *Capt.* to *Maj.*
1914 Sutherland, David L., *Maj.* to *Lt. Col.*
1918 Chamberlain, Samuel V., *Capt.* to *Maj.*
Leonard, Julian T., *Capt.* to *Maj.*
1921 Addicks, Allen D., *1st Lt.* to *Capt.*
Mahoney, Joseph A., *Maj.* to *Lt. Col.*
1922 Merrill, Edward A., *Maj.* to *Lt. Col.*
1923 Lewis, Bernard, *Maj.* to *Lt. Col.*
Lindtner, Fred, *Capt.* to *Lt. Col.*
1924 Sturdy, William W., *Maj.* to *Lt. Col.*
1925 Gardiner, E. Willard, *Capt.* to *Maj.*
Perry, Richard T., *Capt.* to *Maj.*
1926 Colt, Lebaron C., *Maj.* to *Lt. Col.*
Littlefield, Lloyd M., *Maj.* to *Lt. Col.*
McCornack, Willard F., *Maj.* to *Lt. Col.*
Mayer, William B., *Lt. Col.* to *Col.*
Powers, David B., *Maj.* to *Lt. Col.*
Rosser, Bernard P., *Lt.* to *Maj.*
1927 Connor, Robert T., *Capt.* to *Maj.*
de Luccia, E. Robert, *Maj.* to *Lt. Col.*
Frederick, William R., Jr., *Maj.* to *Lt. Col.*
Hershey, Samuel F., *Capt.* to *Maj.*
1928 Harvey, Percy E., *1st Lt.* to *Capt.*
Knight, Alfred C., *Maj.* to *Lt. Col.*
Loer, George W., *Lt.* to *Capt.*
Richheimer, Charles E., *1st Lt.* to *Capt.*
Walsh, Redmond E., Jr., *Lt.* to *Capt.*
1929 David, Marshall S., *Maj.* to *Lt. Col.*
Hoffman, Richard T., *Lt.* to *Capt.*
Miller, Harry W., *Maj.* to *Lt. Col.*
Perkins, Edwin H., *Capt.* to *Maj.*
Zurwell, Rolf A., *Capt.* to *Maj.*
1930 Collins, Robert B., *Maj.* to *Lt. Col.*
Duerson, Samuel H., *Capt.* to *Lt. Col.*
Foster, Robert J., *Capt.* to *Maj.*
Griffith, William F. R., Jr., *Capt.* to *Maj.*
Houston, George M., Jr., *Corp.* to *T.Sgt.*
L'Esperance, Stanley G., *Capt.* to *Maj.*
Rolin, Raymond G., *Capt.* to *Maj.*
1931 Cooper, Albert H., *1st Lt.* to *Capt.*
Danforth, Harland A., Jr., *Capt.* to *Maj.*
Finberg, Irving W., *Maj.* to *Lt. Col.*
Gamber, John F., *Lt. Col.* to *Col.*
Harney, Patrick J. D., *S.Sgt.* to *T.Sgt.*
Heinlein, Rex I., Jr., *Maj.* to *Lt. Col.*
1932 Brown, John J., *Capt.* to *Maj.*
Cook, Frank R., *Lt. Col.* to *Col.*
Demas, James N., *1st Lt.* to *Capt.*
Falk, George W., *Capt.* to *Maj.*
Giddon, Elliot D., *Lt.* to *Capt.*
Glowa, L. Williams, *Lt.* to *Capt.*
Hoyle, Frederick B., Jr., *1st Lt.* to *Capt.*
Ingram, C. Robert, *Lt.* to *Capt.*
Loeb, Robert M., *Capt.* to *Maj.*
MacKusick, Arthur L., *Maj.* to *Lt. Col.*
Morgan, Richard L., *Maj.* to *Lt. Col.*
Roberts, Frederick C., Jr., *Capt.* to *Maj.*
Robins, Raymond R., *Lt. Col.* to *Col.*
1932 Robson, James J., *Capt.* to *Maj.*
Speir, Frank W., *Capt.* to *Maj.*
Sprague, John S., *Capt.* to *Maj.*
Whitaker, Lawrence W., *Pvt.* to *2nd Lt.*
1933 Blanchard, Joseph M., *Pvt.* to *T.3.*
Carbonell, Joseph E., Jr., *Lt.* to *Capt.*
Lapidus, Bernard, *Lt.* to *Capt.*
Potter, John D., Jr., *2nd Lt.* to *Capt.*
Sann, Edward W., Jr., *1st Lt.* to *Capt.*
1934 Bernstein, M. Jack, *Maj.* to *Lt. Col.*
Jones, Wilbur M., *Lt.* to *Capt.*
Joroff, Samuel, *Capt.* to *Maj.*
Martin, Richard E., *Lt.* to *Maj.*
Metcalf, Robert F., Jr., *Capt.* to *Maj.*
Person, Leland S., *2nd Lt.* to *1st Lt.*
Reiss, Winold T., *Maj.* to *Lt. Col.*
Silberman, Marvin J., *Capt.* to *Maj.*
Vaughan, Frederick W., *Capt.* to *Maj.*
Way, Gordon L., *Capt.* to *Maj.*
1935 Bemis, Hal. L., *Maj.* to *Lt. Col.*
Besson, Frank S., Jr., *Lt. Col.* to *Col.*
Challender, Stuart A., *Capt.* to *Maj.*
Eastmond, Charles C., *Corp.* to *Sgt.*
Hecht, Morton, *1st Lt.* to *Capt.*
Lincoln, Rush B., Jr., *Lt. Col.* to *Col.*
Lufkin, Andrew, Jr., *Pvt.* to *Lt.*
Miller, John A., *Capt.* to *Maj.*
Peterson, W. Earl, *Capt.* to *Maj.*
Rinaldo, Thomas J., *Lt.* to *Capt.*
Teasdale, John M., *Capt.* to *Maj.*
1936 Bain, Walter G., Jr., *Lt. Col.* to *Col.*
Blaisdell, Kenneth L., *Lt.* to *Capt.*
Borden, Herbert M., *1st Lt.* to *Capt.*
Chapman, Gerald L., *Capt.* to *Maj.*
Cocke, Norman A., Jr., *Lt.* to *Maj.*
Cohn, Clarence, *1st Lt.* to *Capt.*
Donaldson, Harry M., *1st Lt.* to *Capt.*
Lawrence, James, Jr., *Lt.* to *Maj.*
Maximoff, Boris S., *Lt.* to *Maj.*
Noyes, Walter F., Jr., *2nd Lt.* to *1st Lt.*
Parker, Franklin P., *Capt.* to *Maj.*
Stapler, John G., *Maj.* to *Lt. Col.*
Werblin, David A., *Capt.* to *Maj.*
1937 Brauer, Robert J., *Capt.* to *Maj.*
Cornforth, Robert M., *Capt.* to *Maj.*
Harris, Rutherford, *2nd Lt.* to *Capt.*
Hazeltine, Allen V., *Maj.* to *Lt. Col.*
Marcy, Willard, *Lt.* to *Capt.*
Osborne, N. Montgomery, Jr., *Maj.* to *Lt. Col.*
Post, Ezriel, *Lt.* to *Capt.*
1938 Cagwin, Leland G., *Maj.* to *Lt. Col.*
Fisher, Hillary J., *T.3.* to *S.Sgt.*
Gould, Arthur F., *Capt.* to *Maj.*
Oldfield, Homer R., Jr., *Lt.* to *Maj.*
Pape, F. William, Jr., *Pvt.* to *T.5.*
Rossano, August T., Jr., *Lt.* to *Capt.*
Thompson, Archer S., *Lt.* to *Maj.*
1939 Bernays, Peter M., *Lt.* to *Capt.*
Carr, Nicholas E., Jr., *Capt.* to *Maj.*
Coogan, George J., *1st Lt.* to *Capt.*

1939 Crankshaw, John H., *Capt.* to *Maj.*
Hamilton, C. Watson, *F.O.* to *2nd Lt.*
Leghorn, Richard S., *Capt.* to *Maj.*
Magruder, L. Burns, Jr., *Lt.* to *Maj.*
Morgan, Walter H., *Pvt.* to *Sgt.*
Morningstar, Otto, *Lt.* to *Capt.*
Rippere, John B., Jr., *Capt.* to *Lt. Col.*
Roberts, Simon M., *A.C.* to *2nd Lt.*
Ross, Chester W., *Lt.* to *Capt.*
Ryan, John A., Jr., *1st Lt.* to *Capt.*
Schneider, Paul H., *Lt.* to *Capt.*
Stubbs, Marshall, *Lt. Col.* to *Col.*
Waterman, Donald W., *Lt.* to *Capt.*

1940 Bearce, Marshall P., *Lt.* to *Capt.*
Coan, Jack L., *Capt.* to *Lt. Col.*
Cowhey, Joseph L., *Capt.* to *Lt. Col.*
Darling, Philip V., *Pvt.* to *2nd Lt.*
deCastro, Pedro A., *M.Sgt.* to *2nd Lt.*
Dickson, John R. V., *Lt. Col.* to *Col.*
Godfrey, Charles S., *Lt.* to *Capt.*
Hawes, Harold D., *1st Lt.* to *Capt.*
Helmreich, Louis W., Jr., *Lt.* to *Capt.*
Hodgson, Roger B., *Lt.* to *Capt.*
Keitel, Paul E., *Pvt.* to *Pfc.*
Lippard, Frank W., *Pvt.* to *2nd Lt.*
Miller, Harold N., *2nd Lt.* to *1st Lt.*
Port, Frederick J., Jr., *1st Lt.* to *Capt.*
Robbins, Asher B., *Capt.* to *Lt. Col.*
Sherman, Nathan, *Cadet* to *1st Lt.*
Zeamer, Jay, Jr., *Maj.* to *Lt. Col.*

1941 Alfred, Robert M., *Lt.* to *Capt.*
Beard, Bruce, *1st Lt.* to *Capt.*
Fairbrother, Raymond M., *Capt.* to *Maj.*
Folberth, William M., Jr., *Lt.* to *Capt.*
Harris, Cullie B., *Capt.* to *Maj.*
Marsh, Kirke W., Jr., *Capt.* to *Maj.*
Melchor, Alejandro, *Lt. Col.* to *Col.*
Pratt, Charles H., Jr., *Capt.* to *Maj.*
Remick, John T., *Lt.* to *Maj.*
Renner, John J., *Lt.* to *Capt.*
Robson, Charles D., *Lt.* to *Capt.*
Shore, Lloyd G., *Lt.* to *Capt.*
Stewart, Carlton M., *2nd Lt.* to *1st Lt.*
Tirrell, Stanley A., *Lt.* to *Capt.*

1942 Arend, John S., *Lt.* to *Capt.*
Brach, Herbert, *Corp.* to *T.Sgt.*
Carrington, Thomas R., Jr., *Capt.* to *Maj.*
Cathcart, Richard, *2nd Lt.* to *Capt.*
Cocroft, Reginald B., Jr., *Cadet* to *1st Lt.*
DeLeo, Felix R., *Lt.* to *Capt.*
Downing, Albert G., *1st Lt.* to *Capt.*
Goldis, Alfred, *2nd Lt.* to *Capt.*
Jones, Jack J., *2nd Lt.* to *Capt.*
Kaye, Warren H., *Lt.* to *Capt.*
Klaus, Harvie B., *Lt.* to *Capt.*
Krucklin, Robert E., *Lt.* to *Capt.*
Levere, Bernard, *2nd Lt.* to *1st Lt.*
Norton, Donald A., *2nd Lt.* to *Capt.*
Phaneuf, Philip E., *Lt.* to *Capt.*
Rugge, George, *Lt.* to *Capt.*
Schoen, William C., *1st Lt.* to *Capt.*
Steinberg, Morris A., *Lt.* to *Capt.*
Williams, Baker B., *Lt.* to *Capt.*

1943 Cotter, John F., *A.C.* to *2nd Lt.*
Ford, Laurence M., *Corp.* to *S.Sgt.*
Hornor, Carroll G., *A.C.* to *1st Lt.*
Libbey, W. Scott, Jr., *2nd Lt.* to *1st Lt.*
Perry, Frederick G., Jr., *2nd Lt.* to *1st Lt.*
Pugh, Milton E., *A.C.* to *2nd Lt.*

2–44 Balise, Peter L., Jr., *Pvt.* to *2nd Lt.*
Barnaby, Robert H., *Corp.* to *2nd Lt.*
Barr, George M., *Pvt.* to *2nd Lt.*
Bartz, Robert V., *O.C.* to *2nd Lt.*
Bishop, Warren A., *Pvt.* to *2nd Lt.*
Carey, Francis D., *Pvt.* to *2nd Lt.*
Carroll, Frank E., Jr., *Pvt.* to *2nd Lt.*
Chin, Frank K., *Pvt.* to *2nd Lt.*
Clarke, Robert I., *O.C.* to *2nd Lt.*
Corry, Andrew F., Jr., *Pvt.* to *2nd Lt.*
DeAgazio, Emil A., *Pvt.* to *2nd Lt.*
Delano, Warren B., *Sgt.* to *2nd Lt.*
Dershowitz, Arthur F., *Pvt.* to *T.5.*
Dew, Robert J., Jr., *Pvt.* to *2nd Lt.*
Fogg, Charles E., *Sgt.* to *T.Sgt.*
Gardner, John B., *Pvt.* to *2nd Lt.*
Gavin, William W., Jr., *Pvt.* to *2nd Lt.*
Harjes, Herman J., *Pvt.* to *2nd Lt.*
Harris, Holton E., *Pvt.* to *2nd Lt.*
Henrich, Joseph A., *Pvt.* to *2nd Lt.*
Hopewell, Frederick H., *O.C.* to *Corp.*
Kahl, DeLoss, Jr., *Pvt.* to *2nd Lt.*
Kennelly, William J., Jr., *A.C.* to *2nd Lt.*
Knapp, Norman T., *Pvt.* to *2nd Lt.*
Kratz, Robert F., Jr., *Pvt.* to *2nd Lt.*
Lawson, James T., *Pvt.* to *2nd* Lt.
Lawton, Henry D., Jr., *Pvt.* to *2nd Lt.*
Peterson, Edward H., *Pvt.* to *2nd Lt.*
Rabinowitz, Bernard, *O.C.* to *2nd Lt.*
Schnell, Eugene A., *A.C.* to *2nd Lt.*
Shaw, George R., *S.Sgt.* to *M.Sgt.*
Spalding, William F., *Cadet* to *2nd Lt.*
Veitch, Robert A., *Pvt.* to *2nd Lt.*
Wood, Robert H., *O.C.* to *2nd Lt.*

U.S.N.

1917 Whitney, Richard T., *Lt. Comdr.* to *Comdr.*

1920 Haskell, Henry C., *Lt. Comdr.* to *Comdr.*
Hayler, Robert W., *Capt.* to *Rear Adm.*

1922 Oatman, David P., *S.K.3c.* to *S.K.2c.*

1923 Plant, Paul R., *Lt.* to *Lt. Comdr.*
Redgrave, DeWitt C., *Lt. Comdr.* to *Capt.*

1924 Forsyth, Roland B., *Lt.* to *Lt. Comdr.*
Hart, Robert W., *Lt.* to *Lt. Comdr.*
Jennings, Donald B., *Lt.* to *Lt. Comdr.*
Porter, Louis F., *Lt.* to *Lt. Comdr.*

1925 Cameron, Finlay G., *Lt.* to *Lt. Comdr.*
Hastings, William W., *Lt. Comdr.* to *Capt.*
Kennedy, Moorhead C., Jr., *Lt.* to *Lt. Comdr.*
McCarthy, Edward O., *S.F.2c.* to *S.F.1c.*

1926 Hicks, William W., *Lt.* to *Lt. Comdr.*

1928 Gove, Kenneth G., *Lt.* to *Lt. Comdr.*

1929 Celler, Frederic A., *Lt.* to *Lt. Comdr.*
Southerland, Louis F., Jr., *Lt.* to *Lt. Comdr.*

1930 Chindblom, Richard N., *Lt. (j.g.)* to *Lt.*

1931 Elwell, Allan D., *Lt. (j.g.)* to *Lt.*
Minnick, John H., *Lt.* to *Lt. Comdr.*
Smith, Clifton A., *Lt.* to *Lt. Comdr.*
Thomas, Norman C., *Lt.* to *Lt. Comdr.*

1932 Sprenger, William C., *Lt.* to *Capt.*

1933 Chipp, Rodney D., *Lt.* to *Lt. Comdr.*
Cornell, Francis E., *Ens.* to *Lt. (j.g.)*
Greenwald, James A., Jr., *Lt.* to *Comdr.*
Ward, William E., *Lt.* to *Lt. Comdr.*

1934 Feeley, Frank G., Jr., *Ens.* to *Lt.*
Keatley, John H., *Lt.* to *Comdr.*
McCallum, Angus, *W.O.* to *Ens.*
Pattee, Frederick H., *Lt. (j.g.)* to *Lt.*

1936 Halfmann, Edward S., *Ens.* to *Lt. (j.g.)*
McMillan, Brockway, *Ens.* to *Lt. (j.g.)*
Pierce, Ransom A., *Lt. Comdr.* to *Comdr.*
Van Sant, Ralph W., Jr., *Lt. (j.g.)* to *Lt.*
Webster, Homer F., *Lt.* to *Lt. Comdr.*

1937 Austin, William H., *Lt. (j.g.)* to *Lt.*
Garrels, Robert E., *Lt.* to *Lt. Comdr.*
Graustein, Archibald R., Jr., *Lt. (j.g.)* to *Lt.*
Wallin, Harry N., *Lt.* to *Lt. Comdr.*
Winsor, K. Weston, *Lt.* to *Lt. Comdr.*
Wrigley, Dwight A., *Lt.* to *Lt. Comdr.*

1938 Englander, Robert A., *Ens.* to *Lt. (j.g.)*
Hawkes, Albert J., *Mo.M.M.2c.* to *Mo.M.M.1c.*
Kearny, Francis J., *Ens.* to *Lt.*
Lebow, Ralph H., *Ens.* to *Lt. (j.g.)*
Old, Bruce S., *Lt.* to *Lt. Comdr.*
Ritchie, A. Eliot, Jr., *Lt.* to *Lt. Comdr.*
West, Richard K., *Lt. (j.g.)* to *Lt. Comdr.*

1939 Bartlett, David A., *Ens.* to *Lt. (j.g.)*
Batcheller, Edgar H., *Lt. Comdr.* to *Comdr.*
Chambliss, Allan M., *Lt.* to *Lt. Comdr.*
Howard, John H., *Lt. (j.g.)* to *Lt.*
Leps, Thomas M., *Ens.* to *Lt. (j.g.)*
Robinson, Knight D., *Ens.* to *Lt. (j.g.)*
Youngquist, Robertson, *Ens.* to *Lt. (j.g.)*

1940 Bloomsburgh, Ralph A., Jr., *Ens.* to *Lt. (j.g.)*
Boulger, James H., Jr., *Ens.* to *Lt.*
Carmick, Edward S., *Lt.* to *Comdr.*
Hooper, Edwin B., *Lt.* to *Comdr.*
Mann, Frederick M., Jr., *Ens.* to *Lt. (j.g.)*
Martinez, Rafael J., *Ens.* to *Lt. (j.g.)*
Owens, Joseph F., Jr., *Ens.* to *Lt. (j.g.)*
Powell, Clinton C., *Ens.* to *Lt. (j.g.)*
Smith, Arnold R., *Lt. (j.g.)* to *Lt.*

1941 Chandler, Cedric L., *R.T.2c.* to *R.T.1c.*
Duffy, Ben K., *Ens.* to *Lt. (j.g.)*
Gray, J. Cranston, *Sp.3c.* to *Sp.2c.*
Lansdowne, Falkland M., *Lt.* to *Lt. Comdr.*
Montana, Robert C., *Ens.* to *Lt.*
Riehl, Albert H., *Ens.* to *Lt. (j.g.)*
Scott, Benjamin C., Jr., *Ens.* to *Lt. (j.g.)*
Senif, Howard Z., *Lt.* to *Lt. Comdr.*
Slaughter, Guy W., *Lt. (j.g.)* to *Lt.*

1942 Bunn, Robert H., *Lt. (j.g.)* to *Lt.*
Canney, Frank C., *Lt. (j.g.)* to *Lt.*
Clarke, William N., *Lt. (j.g.)* to *Lt.*
Fernald, Arthur T., *Ens.* to *Lt.*
Greenberg, David F., *Lt. (j.g.)* to *Lt.*
Hall, Charles L., Jr., *Ens.* to *Lt.*
Hancock, Alex F., *Ens.* to *Lt.*
Knapp, William J., *Ens.* to *Lt. (j.g.)*
Loven, Nils O. J., *Lt. (j.g.)* to *Lt.*
Meley, Everett L., Jr., *Ens.* to *Lt. (j.g.)*
Nagel, Albert H., *Ph.M.3c.* to *Ph.M.2c.*
Owen, Robert I., *Lt. (j.g.)* to *Lt.*
Pepper, Edward L., *Lt. (j.g.)* to *Lt.*
Schwartz, Charles W., *Lt. (j.g.)* to *Lt.*
Shrewsbury, Raymond W., *Lt. (j.g.)* to *Lt.*
Tucker, George E., *Lt. (j.g.)* to *Lt.*
Turner, Filo H., *Lt. (j.g.)* to *Lt.*
Vyverberg, Robert G., *Lt. (j.g.)* to *Lt.*
Wingert, Meredith, *Ens.* to *Lt. (j.g.)*
Wittl, Casimir T., *A.S.* to *Mo.M.M.3c.*

1943 Clark, Walter L., 3d, *Ens.* to *Lt. (j.g.)*
Eisenberg, Eugene R., *Ens.* to *Lt. (j.g.)*
Gluck, Simon E., *Ens.* to *Lt. (j.g.)*
Hartman, Orvis B., *Ens.* to *Lt. (j.g.)*
Holway, William N., *Ens.* to *Lt. (j.g.)*
Karstrom, John O., Jr., *Ens.* to *Lt. (j.g.)*
Leader, James W., *Mid.* to *Ens.*
McJunkin, Howard P., *Ens.* to *Lt. (j.g.)*
Maxwell, Robert W., *Ens.* to *Lt. (j.g.)*
Peterson, John, *Ens.* to *Lt. (j.g.)*
Rosoff, Harold D., *Ens.* to *Lt. (j.g.)*
Schultz, Paul G., *Lt.* to *Lt. Comdr.*
Scurlock, Arch C., *Ens.* to *Lt. (j.g.)*
Souder, Paul B., *Ens.* to *Lt. (j.g.)*
Spitz, Seymour J., Jr., *Ens.* to *Lt. (j.g.)*
Stewart, Lawrence E., *Ens.* to *Lt. (j.g.)*
Sutton, Walter G., Jr., *Ens.* to *Lt. (j.g.)*
Upham, John H., 3d, *A.S.* to *Ens.*
Thoerle, John A., Jr., *Ens.* to *Lt. (j.g.)*
Twaddle, Herbert G., *Ens.* to *Lt. (j.g.)*
Watts, John M., *Ens.* to *Lt. (j.g.)*

2–44 Bowes, Henry N., *Mid.* to *Ens.*
Burdick, Robert S., *Lt. Comdr.* to *Comdr.*
Corwin, Harry R., Jr., *A.S.* to *Ens.*
Crowley, Joseph C., *A.S.* to *S.2c.*
Hausman, John E., *Lt.* to *Lt. Comdr.*
LeBaron, Francis N., *Mid.* to *Ens.*
Robillard, Geoffrey, *Mid.* to *Ens.*
Sard, Eugene W., *Mid.* to *Ens.*
Schnugg, George M., *Mid.* to *Ens.*
Spero, Caesar A., *A.S.* to *Ens.*
Vallone, Andrew M., *F.C.3c.* to *Ens.*

U.S.C.G.

1941 Fabik, Theodore J., *Lt. Comdr.* to *Comdr.*

U.S.M.C.

1936 Endweiss, Charles N., *Lt.* to *Maj.*

2–44 Anderson, Harry L., Jr., *Pvt.* to *T.Sgt.*
Baker, Maitland A., *Corp.* to *Sgt.*

CANADA

Army

1934 Williams, Edwin L., *Capt.* to *Maj.*

1939 Guthrie, Richard H., *F.O.* to *Fl.Lt.*

PHILIPPINES

Army

1941 Fajardo, Tirso G., *Maj.* to *Lt. Col.*

SOUTH AFRICA

Army

1925 Bateman, Glen L., *Maj.* to *Lt. Col.*

RANKS NOT PREVIOUSLY PUBLISHED

U.S.A.

1934 Koines, Peter T., *Pfc.*
1940 Wallace, Harold V., *Lt.*

CASUALTIES

1925 ★Kane, John D. H., *Comdr.* U.S.N. — South Pacific
1927 †Gerst, George D., *Lt.*, U.S.A.
1932 *Allee, Edward S., *Col.*, U.S.A. — plane crash
1937 ★Laus, Andre N., *Capt.*, U.S.A.
1940 ★Crimmins, Francis J., *1st Lt.*, U.S.A. — Holland
★Little, Augustine P., Jr., *Capt.*, U.S.A.
1942 †Root, John D., *Capt.*, U.S.A.
★Shepard, Leonard G., *Lt.*, R.A.F.

★ Killed in Action † Missing in Action ‡ Prisoner of War * Died in Service ** Wounded

ALUMNI AND OFFICERS IN THE NEWS

From the Platform

¶ Julius A. Furer '05, Rear Admiral, United States Navy, Co-ordinator of Research and Development of the Navy Department, spoke on October 6 at the fall meeting of the Industrial Research Institute in Atlantic City, N. J., in favor of plans for postwar continuation of military research which would forestall another lapse into unpreparedness. On the same occasion John H. Schaefer '26 led one of the round-table conferences which discussed techniques effective in stimulating industrial research workers to do their best under present conditions; and on October 7 George K. Bennett '27 described psychological tests and testing methods for the selection and assignment of technical research personnel.

¶ Emory L. Chaffee '07, H. B. Richmond '14, and Ernst A. Guillemin '24 addressed a meeting of the Institute of Radio Engineers held at Technology on November 17 on the general subject, "The Challenge to Engineering Education."

¶ Alfred V. deForest '11 presented a paper on "Wire Gages and Stresscoat as Applied to Problems in Stress Analysis" before the Boston section of the American Society of Mechanical Engineers at Northeastern University on November 16.

¶ Robert J. Wiseman '12 read a paper on "A.C. Resistance of Large Conductors in Steel Pipes" to the technical group on insulation of the American Institute of Electrical Engineers, meeting at Northeastern University on November 15.

¶ Kenneth E. Bell '17 spoke at the summer conference of the New England Chemistry Teachers Association in New London, Conn., on August 26 on "Leather Chemistry in War-Time."

¶ Philip H. Hatch '21 spoke on November 8 at Northeastern University on "Electrical Features of Diesel-Electric Locomotives" before the Boston section of the American Institute of Electrical Engineers.

¶ Edwin D. Martin '22 addressed a Chicago chapter meeting of the American Society for Metals, held at the Chicago Bar Association on October 12, on "Advances in Manufacture of Tinplate."

¶ Myron S. Wilson '22 served as chairman for a popular lecture on "Big Game Fishing" by Victor Coty, given under the auspices of the Lynn section of the American Institute of Electrical Engineers on October 24 at the Lynn English High School.

¶ J. Stuart Crandall '27 addressed a joint meeting of the Boston Society of Civil Engineers and the designers' section of the same society on November 5 at the 20th Century Association in Boston on "Recent Timber Floating Dry Docks."

¶ Henry G. Houghton, Jr., '27 and James M. Austin '41 spoke at the Engineers Club in Boston on November 27 on "Meteorology at Home and at War" before the northeastern section of the American Society of Civil Engineers.

New Duties

¶ For Lewis E. Moore '02 and for Louis J. O'Malley '28, recently elected president and secretary respectively of the Boston City Club. Both addressed a meeting held on November 13 in the club auditorium.

¶ For Marcus A. Grossmann '11, who, as retiring president, becomes a member of the board of trustees of the American Society for Metals, and for Charles H. Herty, Jr., '21, elected vice-president, to take office at the annual meeting on October 18.

¶ For Arthur L. Townsend '13, acting director of the Lowell Institute School since last winter, who has been appointed permanent director, succeeding the late Charles F. Park '92.

¶ For Gertrude G. Harris '24, named chairman of the newly organized science-technology group of the Special Libraries Association of Philadelphia, Pa.

¶ For William M. Murray '33, chosen president of the Society for Experimental Stress Analysis, a new group which met for the first time during the four-day session of the National Metal Congress in Cleveland from October 16 through 20.

DEATHS

** Mentioned in class notes.*

¶ Ezra F. Taft '69, October 18.
¶ Walter L. Bouve '74, September 24.*
¶ Robert E. Richardson '85, October 11.
¶ Walter M. Saunders '88, September 22.
¶ Howard C. Slater '90, August 4.*
¶ Henry M. Waite '90, September 1.*
¶ W. Palmer Gray '92, July 18.*
¶ James H. Kelsey '92, January 10.*
¶ Augustus F. Knudsen '92, January 10.*
¶ William H. Lane '92, February 21.*
¶ Moses J. Look '92, July 11.*
¶ Charles L. Nutter '92, December 28, 1943.*
¶ Charles F. Park '92, September 26.*
¶ Horace F. Ruggles '92, March 11.*
¶ Albert F. Sargent '92, January 31.*
¶ Russell Selfridge '92, March 23.*
¶ Nathan B. Day '94, April 26.*
¶ Willard D. Brown '94, July 26.*
¶ Mason S. Chace '94, August 9.*
¶ Thomas P. Curtis '94, May 28.*
¶ J. Howland Gardner '94, July 7.*
¶ Frederic P. Simonds '94, April 19.*
¶ Albert W. Drake '95, October 7.*
¶ William F. Patten '95, November 1.
¶ David W. Beaman '96, October 31.
¶ Edwin C. Cramer '96, October 10, 1943.*
¶ Charles E. Lawrence '96, October 7.*
¶ Nathan C. Burrill '97, May 26.
¶ Allen H. Cox '98, July 5.*
¶ John W. Fleet '98, March 7.*
¶ John N. Goddard '98, August 26.*
¶ George H. Watson '98, October 5.*
¶ Raymond S. Willis '98, June 30.*
¶ Erving R. Gurney '99, September 14, 1943.
¶ Edwin F. Samuels '99, June 3.*
¶ William E. West '99, April 1.*
¶ William S. Pepperell '01, September 10.
¶ Selskar M. Gunn '04, August 2.*
¶ Walter Whitmore '04, September 13.
¶ Joseph C. Baker '05, May 10.
¶ C. Burrows Morey '06, May 13.*
¶ William F. Walker '06, October 9.*
¶ Douglas C. McMurtrie '10, September 29.*
¶ H. Chester Damon '12, September 1.*
¶ Albert W. Buck '13, September 12.
¶ Lindsey W. Whitehead '13, July 15.
¶ Harold V. Fay '14, October 8.*
¶ Paul P. Wrigley '18, May 19.*
¶ Dwight Gray '22, October 31.
¶ John J. Collins '28, March 30.*
¶ Andre N. Laus '37, August 29.*
¶ Ellis J. Siegel '37, January.*
¶ Daniel S. Spengler '38, July 8.*
¶ Francis J. Crimmins '40, September 15.*
¶ Roger W. Butler '41, November 2.*
¶ Howard W. Wade '41, June 15.*

NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

National Metal Congress

The 26th National Metal Congress was held in Cleveland during the week of October 16. Five technical societies shared in a program based on the theme, "Design for Tomorrow" — the American Society for Metals, the Iron and Steel Division and Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers, the American Welding Society, the Society for Experimental Stress Analysis, and the American Industrial Radium and X-Ray Society.

Among the Technology men who presented papers were the following: Earnshaw Cook '22 (co-author), "Further Developments of the End-Quench Hardenability Test"; James R. Long '35 (co-author), "The Copper-Manganese Equilibrium System"; James W. Poynter '32, "The Properties of Aluminum Alloys Melted in an Induction Heated Furnace"; Stewart G. Fletcher and Morris Cohen, both staff, "Dimensional Stability of Steel — Part I — Sub-atmospheric Transformation of Retained Austenite"; Robert W. Lindsay '35, "Annealing Studies on Cold-Rolled Iron and Iron Binary Alloys"; Albert I. Blank '37 (co-author), "Creep Characteristics of a Phosphorized Copper"; Guy C. Riddell '04 (co-author), "Antimony: Its Metallurgy and Refining"; Richard D. Potter '43, "Dilatometric Analysis of Subatmospheric Transformations"; Thomas S. Washburn '26, "Theoretical and Practical Aspects of Deoxidation in Basic Open Hearth Practice"; Howard L. Vickery '21, "Welding as an Aid in Shipbuilding Construction"; Scott B. Ritchie '31, "Welding as an Aid in the Fabrication of Ordnance Equipment"; Augustus B. Kinzel '21, "Solid Phase Welding"; Alvin G. Waggoner '42 (co-author), "Welding of Manganese Steels"; John C. Barrett '34, "The Flash Welding of Alloy Steels — Metallurgical and Physical Characteristics"; Charles W. Gadd '37 (co-author), "Full Scale Fatigue Testing of Crankshafts"; Greer Ellis '38, "Impact Stress Analysis by Brittle Coating."

William M. Murray '33, President of the Society for Experimental Stress Analysis, opened the fall meeting of that society with some words of welcome. Charles W. MacGregor and John M. Lessels, both staff, Augustus B. Kinzel '21, George S. Mikhalapov '26, and George S. Burr '41 served as chairmen of technical sessions; Edward S. Jenkins '16, Robert H. Aborn '20, George V. Slottman '25, and Charles W. Dodge '37, as vice-chairmen.

The annual luncheon meeting for Technology alumni present at the Congress was held this year in the Carter Hotel on October 19 at 12:15 P.M. Professor Victor O. Homerberg '21 presided. Charles H. Reed '20, President, and Lyman B. Johnson '27, Executive Vice-president, of the M.I.T. Association of Cleveland both expressed brief greetings. Carl F. Floe '35, Associate Professor of Physical Metallurgy at the Institute and executive officer of the department, then reported on recent developments and on the plans which are under way for dealing with changing conditions after the war. An enthusiastic question period ensued, such that the gathering did not break up until after 2:00 P.M., and then reluctantly.

Following is the roster of those who attended: Roy D. Mailey '04, General Electric Company, lamp engineer; William L. Enfield '10, General Electric Company, consulting engineer; Paul A. Cushman '11, McGill Manufacturing Company, experimental engineer; Lawrence H. Bailey '15, F. J. Stokes Machine Company, development engineer; John T. Norton '18, M.I.T., Professor of the Physics of Metals; Charles H. Reed '20, Forbes Varnish Company, President; Joseph W. Gartland '21, National Carbon Company, research chemical engineer; Victor O. Homerberg '21, M.I.T., Professor of Physical Metallurgy; Frank W. Schreiner '26, Pratt and Whitney Company, sales engineer; Willard M. Woll '26, Commonwealth Edison Company, engineer; F. Sidney Badger, Jr., '27, Haynes Stellite Company, Vice-president; Eldred W. Bemis '27, Elastic Stop Nut Corporation, engineer of tests; Lyman B. Johnson '27, General Electric Company, physicist; Frank E. Rhinehart '27, Walker and Weeks, architect; Thomas E. Stanton '27, City of Cleveland Department of Public Utilities, engineer; Harold L. Geiger '28, International Nickel Company, development and research department; Edward Hartshorne '28, Western Cartridge Company, chief metallurgist; George N. Wedlake '28, Cockshutt Plow Company, Ltd., plant engineer; George R. Long '29, Frigidaire Corporation, manager of material and process engineering division; Rudolph E. Peterson '30, Motor Products Corporation, metallurgist; John A. Fellows '32, American Brake Shoe and Foundry Company, assistant chief metallurgist; Bruno H. Werra '32, Hevi Duty Electric Company, metallurgist; Carl F. Floe '35, M.I.T., Associate Professor of Physical Metallurgy; Ernest A. Ferris '37, Ordnance Department, U.S.A., ordnance engineer; Richard A. Flinn, Jr., '37, American Brake Shoe and Foundry Company, metallurgist; Blake M. Loring '37, U.S. Naval Research Laboratory; Carl H. Muehlemeyer '37, Muehlemeyer Heat Treating, metallurgist; Leo P. Tarasov '37, Norton Company, metallurgist; Frank S. Gardner '38, American Brake Shoe and Foundry Company, metallurgist; James B. Hess '38, Dow Chemical Company, research metallurgist; Harold McCrensky '38, Western Cartridge Company, metallurgist; Frederic W. Reuter '38, General Electric Company, research engineer; Michael V. Herasimchuk '39, Bethlehem Steel Company, general foreman; Richard H. Kaulbach '39, Syracuse Heat Treating Corporation, metallurgist; Peter E. Kyle 39, M.I.T., Associate Professor of Mechanical Engineering; Charles S. Mercer '39, Aluminum Company of America, reduction plant superintendent; Alaettin M. Aksoy '40, S. K. Wellman Company, metallurgist; Roger F. Mather '40, Willys Overland Motors, Inc., chief metallurgist; Ralph B. Delano '41, Sperry Products, Inc., research engineer; Carl L. Goodwin '41, Aluminum Company of America, metallurgist; John W. Kraus '41, Thompson Products, Inc., methods engineer; Raymond A. Frigon '41, Canadian Car and Foundry, test engineer; Frank S. Wyle '41, Triplett and Barton, Inc., test engineer; and Otto Zmeskal '41, Universal Cyclops Steel Corporation, research metallurgist.

M.I.T. Association of Cleveland

The Association has elected the following officers for the coming year: Charles H. Reed '20, President; Lyman B. Johnson '27, Executive Vice-president; Charles H. Smith, Jr., '42, Secretary; John W. Kraus '41, Treasurer. In view of present conditions, it has been decided to limit the regular meetings to three in number. The first was held on November 14, when Henry B. Kane, Director of the Alumni Fund, spoke to the group on "The Wild World." This was a most interesting talk on Mr. Kane's own hobby, nature study, illustrated with a number of photographs taken by the Edgerton stroboscopic technique. Raymond Stevens '17, President of the M.I.T. Alumni Association, accompanied Mr. Kane and made a few remarks regarding Institute affairs. Regular meetings are planned for February and May. — CHARLES H. SMITH JR., '42, *Secretary*, Steel Improvement and Forge Company, 970 East 64 Street, Cleveland 14, Ohio.

Indiana Association of the M.I.T.

The Association held its first meeting in some time at Indianapolis on October 11 with a very satisfactory attendance. A long range of classes was represented, from 1886 to 1943. The meeting was devoted to club affairs entirely, the constitution being considerably revamped, officers elected, and the times for regular meetings and dues set. We are now so organized that officers will be elected in the spring, to take office in the fall as of October 1. Meetings are to be held at the call of the executive committee, which consists of the officers and any regular committee chairmen. The unanimous expression was in favor of regular evening meetings for the second Wednesday of each month with the understanding that this arrangement may be varied for occasions demanding special dates. Officers elected, to take office immediately and to serve until the 1945 annual meeting next spring, are as follows: President, Stanley C. Boyle '27, Republic Creosoting Company, 1615 Merchants Bank Building, Indianapolis 4, Ind.; Vice-president, Lloyd Wayne, 3d, '96, 1834

North Alabama Street, Indianapolis 2, Ind.; Secretary-Treasurer, Thomas G. Harvey '28, Monarch Steel Company, 545 West McCarty Street, Indianapolis 7, Ind.

Joseph M. Cosgrove '22, of the Lukas-Harold Corporation, will address the meeting to be held November 8 on "Surface Quality and Designation." — THOMAS G. HARVEY '28, *Secretary*, Monarch Steel Company, 545 West McCarty Street, Indianapolis 7, Ind.

New Haven County Technology Club

President Blank, of Waterbury, conducted the first fall meeting, held at the Hotel Duncan in New Haven on October 3. C. E. Smith '00 responded to the many constructive suggestions on railroad management by outlining a few of the humorous and serious operating problems now occurring with some regularity. The Club was fortunate in having as speaker our former sailing master, Jack Wood '17, a lieutenant commander, now on leave from the Institute and serving at the Coast Guard Academy in New London. Absorbing movies and an enthusiastic description of life at the academy were followed by films of Technology sailing at various regattas and of a Bermuda race. Among the 29 attending the dinner were Lieutenant John K. Murphy, commandant of the New Haven district of the Coast Guard, and several other guests. The interest and enjoyment on this occasion point to a successful season. — LAWRENCE B. GREW '27, *Secretary*, Southern New England Telephone Company, New Haven, Conn.

Technology Club of New York

The following have sent in their applications for membership: George D. Doherty '17, designer, 17 Battery Place, New York, N.Y.; Harold Miller '36, aeronautical engineer, Glenn L. Martin Company, care of Otis Elevator Company, 10 West 76th Street, New York, N.Y.; Anthony J. Szynkiewicz '44, naval officer, Naval Ammunition Depot, Crane, Ind. Several evenings of duplicate bridge are being planned for the winter evenings. Anyone interested should speak to Asher Weil '01 or Mike Radoslovich '26. Members are encouraged to come and bring a guest. — WILLIAM D. NEUBERG '17, *Secretary*, 24 East 39th Street, New York, N.Y. WILLIAM L. KEPLINGER, JR., '24, *Publicity Committee*, care of Johns-Manville Corporation, 22 East 40th Street, New York, N.Y.

M.I.T. Club of Northern New Jersey

The Club began its fall activities on October 18 at the Military Park Hotel, Newark, with a smoker which was attended by about 70 members. George A. Chutter '21, President, opened the meeting with a few words of welcome and turned the chair over to Ray Brooks '17, Vice-president in charge of program, who served as toastmaster. Mr. Brooks introduced George R. Harrison, Dean of Science at Technology, who gave a very interesting talk on the subject, "M.I.T. and the War." Dr. Harrison had recently returned from a trip to the Southwest Pacific war area, where, at the request of General MacArthur, he had set up an organization to establish scientific liaison between the field and the laboratories at the Institute.

He stated that the Office of Scientific Research and Development has several hundred projects under way at the Institute, with the result that the staff has been expanded to about five times its normal size and now outnumbers the students. Laboratory facilities have also been greatly increased. He stressed the advantages of having scientific developments sponsored by a civilian authority which is independent of the Army and Navy and not limited by the usual restrictions. Not until a project has been completed, is it turned over to the armed forces for their acceptance or rejection. He mentioned that scientific developments have been determining factors in previous wars and are again playing a large part in winning the present war. The United Nations, with their unfettered initiative and talent for invention, have an advantage over the Japanese, who are primarily imitators. Dr. Harrison interspersed his talk with a number of amusing incidents which he witnessed in the New Guinea and Australian areas.

Other entertainments presented by Toastmaster Brooks included group singing led by Frank Gage '22, a humorous recitation by F. O. Pierson '29, and a short talk by Frank Maguire '17, who explained the steps that were taken when the Club was founded about 10 years ago. — RALPH S. WETSTEN '21, *Secretary*, 87 Passaic Avenue, Summit, N.J.

M.I.T. Club of Western Pennsylvania

Members gathered at the University Club in Pittsburgh on June 2 for the final regular meeting of the season. After a well-prepared dinner, President Dallye conducted a short business meeting at which the following men, whose names had been presented by the nominating committee, were elected as officers of the club for the coming year: President, Joseph H. Cox '23; Vice-president, Norman C. Hill '26; Secretary, Stanley C. Johnson '39; Secretary for membership, Rufus N. Palmer '25; Treasurer, Gilbert N. Reed '23; executive committee, Fred W. Waterman '25, Raymond G. Lafean '19, and Hector A. Lopez '23. The nominating committee tendered, in addition, several worthy recommendations for consideration by the new executive committee. All then listened eagerly to a comprehensive review of the subject, "Planned Estates," by Raymond G. Lafean, who has given much time and study to the technical methods involved in a scientific study of life planning.

In Bradford Woods, 18 miles north of the industrial city of Pittsburgh, a delightful spot belonging to Warren D. Smith and known as "El Rancho" was the scene of a good time for 22 members and guests of this club on the evening of July 18. Transportation was furnished by several provident gas savers. Warren Smith's cottage is picturesquely located on a slightly sloping hillside with many trees, shrubs, and a remarkably green lawn, which would be the envy of many a golf course. We learned that it remains so even in the driest weather owing to springs. Against this background, all enjoyed the wide variety of sandwiches, salads, and beer, topped off with ice cream for dessert. Although the occasion offered an escape from everyday business problems, a variety of conversation was heard, ranging from steel to the good times of the past. In everyone's mind, as the evening drew to a close, was the desire to repeat this type of get-together in the future. — STANLEY C. JOHNSON '39, *Secretary*, 47B Woodlawn Terrace, Clairton, Pa. RUFUS N. PALMER '25, *Assistant Secretary*, 476 Broadmoore Avenue, Pittsburgh 16, Pa.

Technology Club of Rochester

Meeting at the Yacht Club for their annual outing, the Club wound up an old year and started a new on the misty evening of October 14. Nothing but the steaks was reminiscent of old time outings, and yet a small gathering made things cheerful inside. Officers elected for the new year were as follows: Donald B. Kimball '20, President; Frank C. Taylor '11, first Vice-president; Gregory Smith '30, second Vice-president; Frederick J. Kolb, Jr., '38, Secretary; Harold L. Smith, Jr., '39, Treasurer; Harold E. Akerly '10, executive committee member. Two members previously elected to the executive committee continue in office: Kenneth J. Mackenzie '28 and Robert E. Smith '33.

John F. Ancona '03, chairman of the club scholarship committee, reported on activities of the previous year. Attention was concentrated upon partial aid for one of our vanishing civilian students and on preparation for the great influx of candidates after the war. Believing that there will be many returning servicemen eager to resume their education and that the competition for men of high caliber will be intense, the Rochester scholarship committee is endeavoring to lay aside a small nest egg to meet such problems. "Sons of M.I.T." was given its club première, first through the medium of the Alumni Association recordings, and then by the club members themselves. Singing has been rather infrequent at recent meetings, but with this stimulus many of the old Technology favorites were brought out in a quality pleasing to the audience.

Our first gathering under the new officers will be held on November 8, when Chick Kane '24 will be with us to present his fascinating talk and series of colored slides, "The Wild World." His visit will be made the occasion for a ladies night. The next meeting will be the Christmas luncheon.

Members attending the annual meeting were: Charles F. Wray '95; Paul B. Wesson '98; John F. Ancona '03; Harold O. Stewart '09; Henry R. Couch '20; Ermanno A. Basilio '28; Howard S. Gardner '30; Stanley C. Wells '30; Horace S. Ford, Jr., '31; George F. Hollingsworth '33; Robert E. Smith '33; John A. Rodgers '35; Carlyle W. Jacob '36; Frederick J. Kolb, Jr., '38; James S. Bruce '39; Harold L. Smith, Jr., '39; William Staudenmaier '41; Albert S. Knight, Jr., '42; Kenneth Barkey '43; Richard B. Palme '44–2. — FREDERICK J. KOLB, JR., '38, *Secretary*, Building 14, Kodak Park, Rochester, N.Y.

Technology Club of Puget Sound

The Club met in the banquet room of the Seattle Chamber of Commerce on the eve-

ning of October 24. The occasion for the meeting was the presence in Seattle of Paul Chalmers, assistant professor of English at Technology. After the annealing period from 6:00 to 7:00, those present enjoyed a steak dinner with all the trimmings. Professor Chalmers then brought us news of the Institute, outlining present activities there and measuring the increase in activity, in personnel, in number of research projects, and in the annual operating budget. He indicated what the composition of the student body was expected to be in the years immediately following the war. Instead of the normal enrollment of 3100 students in the graduate and undergraduate schools together, it is anticipated that the total enrollment may reach 4500. This increase of some 1400 students will be men returning from the war. We were interested to hear that new courses may be offered in the fields of electronics, instrumentation, propulsion devices, plastics, organic chemistry, food technology, and architecture.

There are now approximately 220 Technology Alumni in the Puget Sound area. Because of the difficulty of travel and the press of business, only about 40 members were present at the meeting, namely: W. Scott Matheson '99, Gerald Frink '00, Ben C. Mooers '04, Charles E. Hamilton '06, Floyd A. Naramore '07, Frederick Fenger, '09, Houghton H. Whithed '11, Kenneth A. Moores '21, Harold K. Moritz '21, Eugene W. Rudow '21, James W. Pratt '23, Holland H. Houston '24, Tony L. Hannah '25, Frank E. Strickland '26, James H. Frink '27, Sidney Gerber '27, Gilbert J. Ackerman '28, Harold W. Bialkowsky '28, Middleton M. Chism '28, John G. Howell, Jr., '29, Joseph M. Buswell '31, Phillip F. Frink '31, Charles C. Wyatt '32, Baldwin Anciaux '35, George C. Morrissette '35, Thomas J. Chang '37, Mahlon A. Winter '38, James W. Barton '39, Theodore P. Snow '39, Robert G. Millar '40, Jacob A. Samuelson '40, George H. Stoner '40, Russell E. Winslow '40, Edward F. Brady '41, William R. Mason '41, Vincent J. Grace, Jr., '42, Carl R. Meurk '42, James B. McMillin '43, and Paul Chalmers, staff. — HOLLAND H. HOUSTON '24, *Acting Secretary*, Rayonier, Inc., 719 White Building, Seattle 1, Wash.

Washington Society of the M.I.T.

The opening meeting of the season, held at the Y.W.C.A. on October 12, augured well for the year, from the standpoint of both the number of men present and the high quality of the speaker. Joe Gaffney '28, a major in the Ordnance Department, was at the piano during the early part of the evening. His music will set the pace for this season's gatherings, with quartet singing by Nick Stathis '29, Larry Conant, '21, and Al Bird '30, headed by Harry Fisk, an Army major. As the new president, Bill MacMahon '22 addressed the meeting briefly and introduced the remaining officers to newcomers. Frank Milliken '04, Secretary, made the amazing statement of his dues records that there are members who have paid up through 1946, although the men involved pretend to doubt it. The society has learned not to question Frank's records; consequently they stand. — During the summer months death claimed two members, Al Hanson '14, and Henry Matson Waite '90.

The Society is fortunate in that Dr. Karl Compton's duties frequently bring him to Washington. He found it possible to be present at the first fall meeting, bearing the Institute's greetings and outlining some of the administration's problems in Cambridge. A few of the situations requiring wise solution were stated by Dr. Compton as follows: conversion of the Institute staff from a war- to a peacetime basis; accounting to the government for facilities erected for emergency research; return of former students in the service for further study, under the terms of the G.I. Bill; policy regarding foreign students; space conversion for peacetime operation. The men present were clearly impressed with the importance of these matters to the Institute.

The speaker of the evening was S. J. Sindeband, traveling representative of the Naval Ordnance Laboratory, Washington, D.C. He was presented by R. D. Bennett, a captain at the Naval Ordnance Laboratory. Lieutenant Sindeband's address was fascinating because of both the factual matter and the personality and sparkle of the speaker. He had been engaged in training naval personnel in the design and operation of naval ordnance equipment for a considerable time when he was ordered into the field to observe the way his former students were performing and to check the efficiency of the equipment at first hand. Hawaii, Guadalcanal, the New Hebrides, Bougainville, Australia, India, Egypt, the Azores, Newfoundland, and New York were the stopping places on Lieutenant Sindeband's globe-girdling flight. Since his work is classified, the talk was nontechnical and delightful: for example, the episode of the cobra in India.

A naval party, including the lieutenant, was passing through a town in a jeep when an outcry was raised because of a cobra. The local snake charmer, on the pay roll of the town, was summoned. With a wand the charmer thrust at the snake, getting the snake excited, so that it struck at the wand repeatedly. After five minutes of that, a yellow leaf was placed on the end of the wand. By slowly advancing the leaf toward the head of the snake, the reptile was induced to move its head toward the leaf, then wave its head and upper body back as the leaf came nearer. Repeated, the maneuver caused the snake to sway its head backward and forward in a slow rhythm until the climax of the hypnosis. At this point the charmer grasped the snake with his hand and held it aloft for all to see, even having his little 3-year-old child come and touch it. If the charmer can master snakes consistently, he holds his job. Otherwise he is soon replaced. John Nolen asked, "What becomes of the snake after it has been charmed?" The reply was, "I saw the charmer walk to the edge of town and throw the live snake out into a rice paddy unharmed."

Geographically, the most interesting flight of the trip was from Karachi to Cairo over the cradle of civilization at the mouths of the Tigris and Euphrates rivers, up the valleys of these rivers to the cities of ancient history, across the desert to the Jordan, Bethlehem, and Jerusalem, and thence across the Suez Canal to Cairo. Lieutenant Sindeband observed that after a short time aloft on a long flight he usually finds himself reaching for a book to pass the time, but during the flight just mentioned he kept at the window constantly. Two remarks in summary closed the talk on a favorable note. First, of all the places visited, only Hawaii approached the United States as a place to live. Second, the United States, behind the aggressor nations in technical development of weapons at the outbreak of the war, is now well in the lead. Lieutenant Sindeband finished with a plea that during peace no lag be permitted in such technical development.

Among those present were: J. G. Crane '90; J. W. Clary '96; W. E. Haseltine '96; B. A. Howes '97; F. A. Hunnewell '97; Martin Boyle '98; C. H. Stratton '00; W. L. Cook '03; M. L. Emerson '04; A. M. Holcombe '04; F. W. Milliken '04; R. R. Patch '06; Alexander Macomber '07; Allen Pope '07; B. A. Robinson '09; R. E. Wilson '12; A. D. Beidelman '15; W. H. Blank '16; A. H. Blake '19; L. J. Grayson '19; M. P. Smith '19; E. M. Kenison '19; P. J. Byrne '20; John Nolen, Jr., '20; L. W. Conant '21; W. K. MacMahon '22; C. A. Moore '22; J. R. Morton, Jr., '22; R. K. Thulman '22; H. L. Bond '23; P. C. Maynard '24; W. W. Sturdy '24; G. M. Tapley '24; H. B. Swett '25; H. T. Creedon '26; E. W. Eddy '26; T. L. Soo-Hoo '26; E. G. Cowen '27; G. E. Thomas '27; J. W. Gaffney '28; G. D. Mock '28; G. R. Williams '29; A. F. Bird '30; J. R. Bloom '30; J. A. Mathews '30; N. C. Nelson '30; S. S. Prentiss '31; G. A. Lowery '32; F. M. Moss '32; R. S. Prescott '32; G. E. Powers '34; F. W. Vaughan '34; Herbert Small '35; G. D. Mylchreest '36; E. V. Ashburn '40; S. L. Cohen '40; J. F. Walter '40; E. M. Redding '42; Z. W. Wilchinsky '42; R. D. Bennett, staff. — FRANK W. MILLIKEN '04, *Secretary*, 613 North Greenwich Street, Falls Church, Va. ALBERT F. BIRD '30, *Assistant and Review Secretary*, 5070 Temple Hills Road, Southeast, Washington 20, D. C.

CLASS NOTES

1874

We regret to announce the death on September 24 of Walter L. Bouve, civil engineer, soldier, legislator, and attorney. The *Christian Science Monitor* said of him on the 25th: "Credited with mapping out most of Hingham's water system, he was named by President McKinley in 1898 as assistant adjutant-general for Massachusetts. He served as a captain in the Spanish-American War, and as a major during the Mexican border incident. He was graduated from Massachusetts Institute of Technology in 1874 and from Harvard Law School in 1879, and had been a practicing attorney since 1880. Mr. Bouve was appointed Special Justice of the Second District Court of Plymouth in 1885, was Special Assistant District Attorney of the Southeastern District in 1890–91, and was elected to the House of Representatives from Hingham in 1896. In 1899 he served in the State Senate."

1888

Your Secretary is writing these notes from Chebeague Island, Casco Bay, Maine. Tomorrow he leaves with Mrs. Collins and daughter Katharine for Princeton, N.J.

We take the car, filled with household goods and Yellow Boy, our Persian cat, on board the 60-year-old steamer, *Emita*, for the 10-mile voyage to Portland, thence overland to Newport, R.I., where we stay overnight with our daughter Sallie, wife of Lieutenant J. R. Hughes, Jr., and granddaughter Prudence. The following day we travel to 39 Wiggins Street, Princeton, N.J., our winter home, to remain until April 15.

One of our most distinguished classmates is Nathaniel I. Bowditch of Framingham, a neighbor of Luther Bridges, who sends the following tribute, taken from an editorial in the Boston *Herald:* "What was written on this page four years ago about County Commissioner Nathaniel I. Bowditch of Middlesex is pertinent today, now that he is again a candidate for renomination in the Republican primaries: 'He is one of the best known, most highly respected and most useful citizens of the county. He has been a commissioner since 1926 and has had a large part in the skillful administration which has made Middlesex one of our best units of government . . . He richly deserves renomination and reelection . . . He has set an excellent example for those who wish to serve the public.' Mr. Bowditch is the kind of man the late President Lowell had in mind when he said that the merits of our government are due largely to experienced officials, the department heads and their associates of whom the public hears little. Their experience is invaluable. They carry on not only effectively but uprightly. Men like Mr. Bowditch, and there are hundreds of whom he is typical, attend to their duty as conscientiously as to their own personal, intimate affairs."

Frank M. James, one of our quiet members, has moved from 50 River Street to 61 Brown Street, Haverhill, Mass. He entered the Institute with us from Haverhill and has always lived there. — Your Secretary has become a movie star in a small way. He posed as a Princeton professor in a scene on Nassau Street in *Wilson*. As there were 12,000 other people in the cast, he is not very proud of his career so far. — In our next issue you will hear from Sanford Thompson with all the latest class news from Boston and vicinity. — Bertrand R. T. Collins, *Secretary*, 39 Wiggins Street, Princeton, N.J. Sanford E. Thompson, *Assistant Secretary*, 620 Newbury Street, Boston 15, Mass.

1890

Henry Matson Waite, another of our outstanding men, passed on at his home in Washington on September 1. Builder of the $41,000,000 Cincinnati Union Terminal and supervising engineer of the $3,300,000,000 public works program of the National Industrial Recovery Act, Colonel Waite, as he told us at our 50th reunion, had "done a little of everything, railroading first, then coal mining; being city engineer of Cincinnati, city manager of Dayton, and 18 months at war, rebuilding wrecked roads," before becoming a private consultant in New York and president of the Lord Construction Company.

"In 1927," as stated in the New York *Times*, "he was called as chief engineer of the . . . Cincinnati terminal, a job he finished in March, 1933. The project, designed to bring together every railroad serving the city and to eliminate a bottleneck that handicapped through freight movement, required the erection of seventeen buildings, a huge two-deck viaduct, a great terminal building with a concourse eighty by 500 feet, the laying of miles of track over a 280-acre tract, and the lifting of that track above flood level by bringing in 5,500,000 cubic yards of fill. There were financial difficulties as well when four years of depression nipped the railroads footing most of the bill. But he finished the work a month ahead of time, just before the Ohio River's greatest flood in years drove the railroads from their old stations."

He told us in 1940 that he had "set up the paper organization for the Public Works Administration and put in a year and a half operating it." He also said that "having become much interested in humanity in public life, especially in country youth," he had acted as chairman for the National Youth Administration at Quoddy, Maine. At the time of his death he was consultant on war projects in the United States Budget Bureau. A member of many societies, he had received the honorary degrees of Doctor of Engineering and Doctor of Laws. Our sympathy goes out to Mrs. Waite, who survives him.

Howard C. Slater, who was a captain in our student days, died in New York on August 4. From his wife, to whom the class sympathy has been extended, the following information has been received. He was superintendent of the Milwaukee Electric Light Company for several years, then was associated with his brother in the Gas Engineering Company in Boston. Later, he was with the Eddystone Manufacturing Company at Eddystone, Pa. For 12 years he was with the Du Pont Company in Wilmington, Del., after which he was for many years with the Edison Company in New York and was retired in 1937.

The address of Martin O. Southworth has been changed to 1340 Hyde Park Boulevard, Chicago. Harry L. Noyes now receives his mail at 327 Buffalo Avenue, Niagara Falls, N.Y. Frank M. Greenlaw is back at 36 Bull Street, Newport, R.I. The Secretary was notified in May that William P. Flint had returned from St. Petersburg, Fla., and that his address is now Box 467, Coudersport, Pa.

B. A. Lenfest dropped in to the Secretary's office in October after a 10,000-mile trip around the country. He reported calling on Burdett Moody in Los Angeles, finding him in poor health, but spending a fascinating hour listening to his tales of the early days in the Dakotas — of killing buffalo for their hides at $3.00 each, and other hunting and fishing exploits. We hope he may be able to come back to our 55th anniversary, which according to the present schedule should be celebrated on Alumni Day, Saturday, June 23, 1945. — George A. Packard, *Secretary*, 50 Congress Street, Boston 9, Mass. Harry M. Goodwin, *Assistant Secretary*, Room 4-242, M.I.T., Cambridge 39, Mass.

1892

Our Secretary, Professor Charles F. Park, died at his home in Taunton on September 26, after an illness of more than a year. Funeral services were conducted at his home, 21 Prospect Street, by the Rev. Wilton E. Cross, pastor of the First Unitarian Church, Taunton, on September 28. The following acted as honorary pallbearers: Ralph Lowell, trustee of the Lowell Institute; Arthur L. Townsend '13, Associate Professor of Mechanical Engineering at M.I.T. and director of the Lowell Institute School; George E. Russell '00, Professor Emeritus, M.I.T.; Professor Raymond D. Douglass '31 and Ralph Adams '11, of the Lowell Institute School Faculty; B. K. Thorogood, head of Franklin Technical Institute; Robert B. Cheney, Secretary of the Alumni Association of the Lowell Institute School; and Professor Charles W. Fuller, representing the Class.

An article on Professor Park's life and activities appeared in the November issue of the Review. The following resolutions, prepared by a committee consisting of Arthur L. Townsend, John A. Lunn, and Charles E. Fuller, chairman, were adopted at the meeting of the Alumni Council on October 30: "Professor Charles Francis Park died September 26, 1944, at his home in Taunton after a long illness. Professor Park entered Technology in the fall of 1888, after graduating from the Taunton High School, and graduated with a Bachelor of Science degree in Mechanical Engineering with the Class of 1892. He was appointed to the staff in September of that year as an assistant in the Mechanical Engineering Laboratories and rose through successive grades to a professorship in Mechanism in the Department of Mechanical Engineering in 1912, a post which he held until his retirement as professor emeritus in 1934, after 42 years of service. His skill as an instructor in Mechanism was an inspiration to his students; due in no small way to a natural mechanical instinct. This was also in evidence in his hobbies as a collector and restorer of antique clocks and owning and experimenting with various automobiles of the earliest type. Upon his appointment to an assistant professorship he was placed in charge of all courses in Mechanical Engineering drawing and later, on retirement of Professor Schwamb in 1911, was made director of all work in the mechanical laboratories at the Institute. He was the pioneer in developing the instruction in the automotive option of the Mechanical Engineering Course.

"In 1903 the late President Lowell, trustee of the Lowell Institute, requested the President of Technology to designate a member of its teaching staff to draw up a plan and a curriculum for an evening school especially designed for giving foremen and other employees in industry the fundamentals of an engineering training, which could not be obtained from practical experience alone. Professor Park was appointed to the task by President Pritchett. The plan which he worked out called for regular attendance at courses in the class rooms and laboratories of the Institute three or four evenings a week extending over a two-year period. Each student would be required to pass stated entrance examinations and on satisfactory completion of a designated course of study would receive a graduate certificate. President Lowell accepted the plan without modification and appointed Professor Park to be Director of the Lowell Institute School, which position he held to the time of his death. From small beginnings, this new project in the field of engineering education was, through

his foresight, great enthusiasm, and untiring energy, organized and developed into a school with a peacetime enrollment of over 1,000 students.

"Active in the affairs of the Alumni Association, he was a member of the Council for many years and served on a number of committees, being chairman of the committees in charge of registration at a number of Alumni Reunions. In June 1941 he was elected secretary of the Class of 1892 and helped organize and carry through with his usual energy the plan for a successful 50th reunion of the Class. He was active in many church, social, and civic enterprises in the city of Taunton, where he lived from early boyhood. Professor Park was a fellow of the American Academy of Arts and Sciences, and a member of the American Association for the Advancement of Science, the American Society of Mechanical Engineers, the Society of Automotive Engineers, the Society for the Promotion of Engineering Education, and the National Education Association. He belonged to Alpha Tau Omega and was a lieutenant colonel in the Officers Reserve Corps.

"*Resolved*, That in the passing of Charles Francis Park the Alumni Association, the Massachusetts Institute of Technology, the Lowell Institute School, and a host of colleagues and former students have lost an able administrator, a faithful servant, and a sincere friend, the memory of whom will be long treasured. *Be it further resolved*, That this tribute to his memory be spread on the records of the Alumni Association and that a copy be sent to his widow, to whom we extend our profound sympathy in her great loss."

During the summer word was received announcing the death of Moses J. Look, who died of a heart attack on July 11 at his home in Provincetown. Look was a member of the course in Civil Engineering and followed throughout his life a notable career in his chosen profession, beginning as a transitman with the State Board of Health, and continuing as assistant and division engineer with the Metropolitan Water Works of Massachusetts. For over 35 years following 1895 he was engaged in important engineering and construction work, first as engineer and general superintendent of MacArthur Brothers and Winston and Company, and later as vice-president and general manager of Winston and Company. Important projects were the construction of the Cross River Dam and Reservoir at Katonah, N.Y., the Ashokan Dam at Dykes, N.Y., a construction contract for the New York City Water Works in the Catskills, and a dam and reservoir for the city of Pittsfield, Mass.

During World War I he was in charge of several railway construction projects and served as vice-president of the Kingston Ship Building Company, Kingston, N.Y., and as chairman of the executive committee on the board of directors of the West Point Shipbuilding Company. He was also in charge of the construction of Cantonment Abraham Eustis at Lee Hall, Va., and of the Skiff Creek Dam and Reservoir at Newport News, Va. After completion of the Newport News project his company was engaged in the construction of the Cobble Mountain Dam for the city of Springfield, Mass., and the Alcove Dam for the city of Albany, N.Y. As a prominent engineer he was engaged as an expert witness in court proceedings at various times by the city of New York, the city of Springfield, and the Commonwealth of Massachusetts. He was qualified by passing the civil service examinations for a senior engineer in Massachusetts and for a construction engineer in the United States Reclamation Service. He was a member of of the American Society of Civil Engineers, American Society of Military Engineers, and the New England Water Works Association. He was a licensed engineer and surveyor in the state of Massachusetts and a professional engineer in the state of New York.

We have also received during the year notices of the deaths of the following members of the Class: Charles L. Nutter, December 28, 1943; James H. Kelsey and Augustus F. Knudsen, January 10, 1944; Albert F. Sargent, January 31; William H. Lane, February 21; Horace F. Ruggles, March 11; Russell Selfridge, March 23; and William P. Gray, July 18. The Secretary, however, has at present no details of the life activities of these members.

We have received information that our Class President, J. Scott Parrish, is at his home in Richmond, Va., recovering from an operation which he underwent last summer. We extend to him our best wishes and hope that he may soon be restored to normal health. — At the request of Harry J. Carlson and our Vice-president, Herbert G. Fairfield, the writer has consented to act as Secretary until such time as the Class may be able to assemble at a future meeting. Members of the Class and especially of the executive committee appointed in 1943 are invited to send in items of interest. — CHARLES E. FULLER, *Secretary*, Box 144, Wellesley 81, Mass.

1894

As a follow-up or appendix to the account of our 50th anniversary reunion, excerpts from some of the letters received from men who could not be with us will surely be of interest to the Class. Space did not permit their inclusion last month. From Ray Price, Los Alamos, Calif.: "My heart and my conscience have been in daily conflict since your reunion notice. The Class has done a great deal for me, more than I can calculate. I ought to attend this reunion and shake the warm friendly hand of every member who is there. . . . What a virile foundation we built together, each in his own way, but all with the same material and all destined to support active useful lives of credit to our alma mater. . . . The war is doing much to write our list of absentees, of whom I am one, but I shall be as close to those who do assemble as mind and heart permit. I count on you to let our classmates know my feelings, my sympathies, and my abiding affection." — From Lewis S. Greenleaf, Loudonville, N.Y.: "I have been hoping that I might be able to go to Boston this June. I find, however, that it will not be possible, or at least advisable, for me to undertake this trip, attractive as it sounds, and I shall have to leave it to you to tell the other old men of '94 how sorry I am not to be with them on this 50th anniversary."

From S. H. Blake, Schenectady: "Heretofore, when these occasions came around, I have always promised myself that I would certainly attend next time. This time it is my wife's illness that prevents me, not press of work, as has often been the case in the past; for I have been on the retired list nearly two years. I should much enjoy meeting again so many classmates and wish the meeting success." — From A. M. Robeson, Marlow, Bucks, England: "I hope you will have a good muster of '94 men and that many interesting experiences will be told. [None could be more so than his own. — S.C.P.] Please say to anyone who may remember me that the last time you saw me in 1938 'there was no change in his looks and he might live to be 100.'" — From T. Clive Davies, Hawkley Hurst, England: "How I wish I could attend. It would be so pleasant to greet old classmates. Technology seems to be more conspicuous than ever as a leader in the training and production of outstanding men for the nation, and indeed the world!" — From C. B. Beach, Dubuque, Iowa: "Indeed I should like to attend the 50th class reunion. I had been looking forward to the event with hopes. . . . My health is good; I am blessed with an excellent wife and three daughters. One daughter married a 'minister of music' and lives in Memphis, and one, a physician in Hilo, Hawaii. The unmarried daughter is not far from Boston, as she is head of the occupational therapy department of the Worcester State Hospital."

From Arthur LaMotte, Wilmington, Del.: "I can't come back to the '94 reunion. My wife is so ill I can't leave her. I went to my 50th at Phillips Academy and found a bunch of bald-headed, retired ministers — and me a dynamiter! I've spent eight years in a dynamite factory, four in developing new high explosives, and twelve testing them in mines, quarries, construction work, submarine blasting, and tunnels. I had an ear damaged in an air-pressure tunnel, and several close calls. The rest of my explosive life I have spent in trying to teach the efficient, economical, and safe use of explosives. I took out some patents on new or improved explosives and accessories, but teaching safety is my hobby." — From Leslie Dana, St. Louis: "I shall not be able to come to the 50th reunion. I went to my first one 25 years ago and was shocked to see how old everyone was. Then I knew I was old, too; I had not noticed it before. I have retired but still play tennis, badminton, and walk a good deal."

From Harry R. Bates, Atlanta: "Nothing would give me greater pleasure than to be in Boston for our 50th reunion. I did get to the 35th, but the 50th is simply not to be. Three years ago our company moved its headquarters to Chicago. I tried to resign and asked to be relieved of all production responsibility after being for 30 years production manager of 30 plants scattered from Houlton, Maine, to Texarkana, Ark., designing, building, and operating these plants. Our president asked me to stay on another 30 years and do about as I pleased. Since then I have built an Epsom salt plant and a silica gel plant. I am also the research spark plug for carrying on of some interesting problems. On May 1 our big fertilizer plant here burned up, and they asked me to supervise its rebuilding; so there goes my Boston trip!

The ranks are thinning out, and I'd love to see those who are left, especially the Old Guard (Course V men). Our daughter married a Georgia Tech man who is now chief production inspector for General Electric at Schenectady and has 2,300 men under him. They have a son 12 years old. I'm sure the reunion will be a big success, and should any inquire about me, tell them I'm still alive and kicking and send warm personal regards." — From John C. Nowell, San Mateo, Calif.: "I sincerely hoped that when the time came the travel situation would be such that I could bring Mrs. Nowell east and attend our 50th. After all there is only one in a lifetime. It was a great pleasure to meet our classmates at our 45th, and I promised myself then that if it were possible I would renew the experience in five years." — From Tom Richards, Cheshire, Conn.: "I am really very sorry I shall not be able to be present. This is not my decision but that of the doctor. My best wishes to all the boys." — From Austin Sperry, Berkeley, Calif.: "I am extremely sorry that I cannot again repeat the happy experiences of five years ago. Mrs. Sperry and I had counted on it, but the difficulties of travel in wartime make it impossible." — From H. N. Parker, Jacksonville, Fla.: "I deeply regret that it is not possible for me to get to the reunion. Remember me to those who do attend."

The wife of F. B. Abbott, Bellingham, Wash., wrote on May 27: "It was our intention to attend the reunion, but Mr. Abbott had a slight stroke in April which put an end to it. He is sitting up today and we now have hopes of a recovery. He would like to send greetings to any present who would remember him." — Mrs. Theodore Horton, Sandwich, Mass., sent word that Teddy had overworked as a member of the rationing board and had suffered a second heart attack. — Mrs. F. M. Greenlaw (Emma Kramer), Newport, R.I., wrote that illness prevented her from attending. Her husband, formerly on the mathematics staff at the Institute, is teaching at Brown University. — Letters of like tenor were received from Henry Dates, now a retired professor and consulting engineer in Cleveland; from Charles Meade, whose son, now a colonel in the Army, came home on a brief furlough at reunion time after an absence of two years and just before leaving for foreign service; from Frederick S. Bigelow, now retired after long service as associate editor of the *Saturday Evening Post*, in which he was perhaps the leader in the cause of limited immigration; from James C. Kimberly, of Neenah, Wis., Washington, and just now of Tryon, N.C., whose son Jim is a lieutenant commander in the Coast Guard; from John Kittredge, of Hartford; from Dan Richards, of Salem, Va., now retired after years in railroad service; from George Anderson, of West Newbury, who claims to be a farmer; from Walter Batson, of Newton Center, who was prevented from attending because of an operation for cataracts; and from Leslie Moore, of Concord, now retired from the Massachusetts Department of Public Utilities, who could not come because of the serious illness of Mrs. Moore.

One aftermath of our reunion has given the Secretary unexpected and extremely great pleasure, and he has been deeply moved as well as especially happy as a result. It seems that certain members of the Class felt that some recognition of the long service of the Secretary was in order, although the Secretary hastens to disclaim this, as he has had a continuous reward in the warm and ever loyal friendship of his classmates. Nevertheless, from rumors via the grapevine route it seems that a group of '94 men with the connivance and cordial approval of Dr. Compton, and even of the Secretary's wife, secretly arranged that a portrait of the Secretary should be painted and given to the Institute. This plan, thoroughly consummated by a committee consisting of Alan Claflin, Albert Tenney, and Leonard Tufts, did not come to the Secretary's knowledge until September. H. Bingham Ballou, Jr., of Medford, an artist of unusual skill in portraiture, was commissioned to paint the portrait, and it is now well on the way to completion. This action by the Class is so overwhelming and so deeply appreciated that the Secretary is powerless to express adequately his thanks. The same week brought a letter from Dr. Compton's office stating that the laboratory of food technology, when reestablished in a new and greatly improved and enlarged location, was by the unanimous vote of the Executive Committee of the Corporation thenceforth to be designated as the Samuel Cote Prescott Laboratory of Food Technology. Surely blessings and rewards sometimes come to those who are least expectant, and in this case they give unusual satisfaction and joy to the years of retirement from active service.

Speaking of retirement, here is an item which interests us all. On June 20 Charles G. Abbott resigned as secretary of the Smithsonian Institution at Washington, after 17 years of brilliant service. He will remain on the staff under the title of research associate and in this capacity will no doubt continue and perhaps increase his splendid researches on solar radiation and kindred subjects. With characteristic modesty he did not give us any intimation of his intention to retire when at our 50th reunion in early June. It is a matter of pride and interest to '94 that Abbott and Fowle entered the Astrophysical Observatory of the Smithsonian as soon as they had taken their degrees in Physics at the Institute, Fowle in 1894 and Abbott the following year after receiving his M.S. degree. Each found there his lifework and brought luster to '94's record in science. Abbott became assistant, 1895, then aid, acting in charge, 1896 to 1906, acting director, 1907, and director of the Astrophysical Observatory in 1907. He traveled widely and established or co-operated with observatories in South America, South Africa, and at Mount Wilson in California. A member of the National Academy of Sciences, he was home secretary, 1918 to 1923. Honors have been showered on him in the form of both honorary degrees and medals, including the Draper and the Rumford medals. He visited Australia in 1914 and received a D.Sc. degree from Melbourne University. He was awarded D.Sc. degrees by the Case School of Applied Science in 1931, and by George Washington University in 1937. In 1933 he received an LL.D. degree from Toronto University. He has also been a prolific writer with at least six books to his credit and many volumes of scientific reports of which he was sole or joint author. With a world-wide reputation in his field of solar radiation he unquestionably stands in the top rank of scientists.

Record must now be made of the loss by death of several of our classmates, all men of fine character and high professional attainment, whose careers were marked by service of distinction. They nobly represented their Class and their school.

The sudden death of Nathan Day in April was previously mentioned. One of our most loyal classmates has gone. Having completed his course at Harvard in '92, he came to Technology and was graduated with '94 in Mechanical Engineering. After six years of engineering he entered the Harvard Law School and in 1902 was admitted to the Massachusetts Bar and to the bars of the patent office and the federal courts. For nearly two years he was with the Montreal Light, Heat and Power Company. He then returned to Boston and opened an office as counselor of law at 84 State Street. Day was constant in his attendance at our reunions and at alumni affairs and had a host of friends. Aside from his legal associations he belonged to the Harvard and Union Clubs, The Country Club, Brookline, the Longwood Cricket Club, and others. He especially enjoyed tennis and golf. He was active in the work of the New Old South Church and in many charitable organizations. We miss him as a quiet, loyal, and thoroughly dependable friend and gentleman.

Frederic P. Simonds, whose death has also been previously mentioned, was for years a practicing architect in New York and for the past 11 years assessment clerk of Mamaroneck, N.Y., where he resided. His death was due to a heart ailment. A native of Salem, where he was born in 1872, he entered the Institute in 1889, and was graduated with 1894. For a time he practiced architecture in Boston, before establishing his New York connections. He is survived by his wife and a son, Robert Simonds, a sergeant in the Army.

Six days preceding our reunion we were saddened by news of the death of Thomas P. Curtis, one of the best known and keenly alert members of the Class. A native of San Francisco (1872), Tom joined the Class in the sophomore year, was active in athletics and an excellent student in the course in Electrical Engineering. After graduation he studied for a year in Dresden Polytechnic, Germany, and then joined forces with Frederick W. Lord '93 in organizing the Lord Electric Company in Boston, and later establishing an office in New York as well. This firm has been highly successful for over 40 years. As a member of the Boston Athletic Association team that went to Athens for the first Olympic games, Tom established the world record of 17⅗ seconds for the 110-meter hurdles race. During World War I he was a captain in the Massachusetts State Guard and a member of Governor Coolidge's staff. Although always full of business, Curtis maintained his interest in sports and was an ardent golfer. He was a member of The Country Club, Brookline, and the Tennis and Racket Club of Boston, where in recent years he resided. He leaves two sons, Thomas, of Washington, D.C., and H. Pelham Curtis, of Dayton, Ohio, a major in the Army Air Forces, and nine grandchildren.

On July 7 occurred the death of John Howland Gardner at his home at Old Lyme, Conn. Gardner was born at Newport, R.I., on February 28, 1871. As a student at Technology he specialized in naval architecture and marine engineering and after graduation became assistant to the chief engineer of the New York, New Haven and Hartford Railroad. In 1913 he became vice-president of the New England Steamship Company, in charge of engineering and operations. In 1928 he became president of the company. He retired in 1931 but retained directorships in that company and in the Hartford-New York Transportation Company. During the World War he was a member of the government Board of Survey and Consulting Engineers which supervised the reconditioning of German and Austrian vessels seized in American ports. For some years he was also chairman of the equipment committee of American railroads, which dealt with valuation questions affecting equipment. He was president of the Society of Naval Architects and Marine Engineers from 1930 to 1933 and had been president of the Engineers Club of New York and a member of the executive committee of the Webb Institute of Naval Architecture. He is survived by his wife, the former Helen Douglas of New London, a son, J. Howland Gardner, Jr., and a daughter, Mrs. George W. Elkins.

Willard Dalrymple Brown, for 50 years a Boston architect and long prominent in Lexington civic affairs, died at his home in that town on July 26. Brown was born in Charlestown in 1871, was graduated from Harvard in 1892, and spent the following two years at Technology in the department of architecture as a member of our Class. He immediately opened an office in Boston and designed many public buildings and residences. In Lexington he served on the school committee and was a member of the town planning board for three years. He was active in the establishment of the Lexington Children's Museum, was president of the Bucknam Tavern Community Association, and vice-president of the Lexington Historical Society. In the professional field he was a member of the Boston Society of Architects, the Massachusetts Society of Architects, and the American Institute of Architects. He was also a member of the Hancock Congregational Church of Lexington and the Field and Garden Club of that town. He left a daughter, Mrs. George Schoenhut of Hanover, N.H.

Mason Smith Chace died in San Diego on August 9 after a long illness. For several years he had been living at the San Diego Club and, so far as is known, had not recently been engaged in professional work. Graduated from Course II in the option in naval architecture and marine engineering, he won in 1894 a presidential appointment to the French Government School of Maritime Engineering in Paris and was there for two years. At the time of the war between Japan and Russia he served as a technical adviser to the Japanese Navy and in 1904 supervised the construction of its first two submarines. He was connected with shipbuilding companies thereafter and was in Paris when World War I broke out and offered his services to the French Government. They made him a member of the French High Commission and sent him to the United States to purchase supplies, to supervise the inspection of the manufacture of these supplies and prepare them for shipment. For his excellent work he received the award of the Legion of Honor. From 1920 to 1930 he was engaged in research and in confidential matters relating to naval engineering. Becoming interested in aviation, he obtained a pilot's license and did considerable flying in California, where he had gone to retire from active work as his health had become somewhat impaired. There his last years were spent as quietly as was possible for one of his active and roving spirit.

We close on a triumphal note. The campaign for the Alumni Fund, which we chose as our special contribution to the Institute on the completion of 50 years, has now exceeded 250 per cent of the quota assigned to the Class. We hope it will reach 300 per cent before the end of the fiscal year — so do your part. For this fine record credit must go largely to A. B. Tenney, our Class Agent, aided and abetted somewhat by the Secretary, and in fact by the Class as a whole. On behalf of Tenney and himself, the Secretary extends congratulations to the Class for its spirit and thanks for its cordial support. At the present time '94 leads all the classes by a wide margin and has created a plan and set a mark for succeeding classes. — Samuel C. Prescott, *Secretary*, Room 3–233, M.I.T., Cambridge 39, Mass.

1895

Albert W. Drake, VI, passed away on October 7, at his home, 1025 Park Avenue, Plainfield, N.J. He was born in Boston on November 15, 1872, and after graduation from the Institute, he entered the employ of the American Telephone and Telegraph Company at Philadelphia, Pa., and as the company grew, he grew with it for 37 years of service, until 1932, when he was forced through ill health to retire, after reaching the position of general commercial superintendent. It was after his retirement that he became known to the public as a man interested in social and civic work. Freedom from regular business activities enabled him to devote his full time to pursuits in which others could only participate in leisure moments. He was active in many fields; he served as director of Plainfield Emergency Relief Administration; chairman of Plainfield Red Cross campaigns; member of Selective Service Board 13; Boy Scout Council member; on the recreation commission, and on several state boards and commissions.

Everyone in Plainfield knew Al Drake, and Dixon C. Philips, mayor of Plainfield, stated: "By the death of Albert W. Drake the community has suffered a great loss. . . . For many years, he has given unselfishly and unstintingly of his ability and effort in various community endeavors. . . . He had the affection and the admiration of all as an outstanding citizen of our community. We shall miss him." Al was always a great golf enthusiast and known to golf caddies for many years as a "pleasant man to work for and a generous tipper." He relinquished the game more than a year ago. He certainly was a most genial and interesting fellow to meet, and our class reunions proved his sincere desire to see that everyone was made comfortable and happy. The class members will also miss him. His political affiliations were varied; he voted both the Republican and the Democratic ticket, at different times, believing wholly in a choice based on efficiency and service, rather than on one made as a strict party follower. He is survived by Mrs. Helen C. Drake; a married daughter, Mrs. Martin; a daughter Marjory of the Women's Army Corps, stationed at Fort Oglethorpe, Ga.; a son Robert; two brothers and three sisters. Chester F. Drake '98, is one of his brothers.

Your Secretary was delighted to hear the voice of Fred B. Cutter '98, of New York, who passed through Ayer recently with Mrs. Cutter on his way to western Massachusetts on business. Fred is a busy fellow but never neglects to check up on his class comrades when passing through their territory. We had a letter recently from Judson Dickerman inquiring about the questionnaire for our 50th reunion in 1945. This questionnaire will be forthcoming shortly and will seek suggestions as to time, place, duration, and cost. War conditions will undoubtedly affect the reunion in some respects, but if we can get together for at least "a talk and a good steak," the effort to attend will be justified. Our 50th reunion will be a notable event, and we all should endeavor to be on hand for that as well as the next Alumni Dinner. Last month Gerard H. Matthes mailed your Secretary a feature story called "Old Man River Is Helping Allies Win The War," printed by the *Commercial Appeal* of Memphis, Tenn., on August 6. It is an interesting history of the experiments made by the Waterways Experiment Station, an agency of the Army Corps of Engineers, in connection with developments of the steel landing mats for air bases installed by invading armies. As soon as possible, a condensed digest will be made and printed in these columns so that we may all learn what Matthes is doing, as he is director of this agency. He writes, "My work is strenuous but as yet I have not weakened." — Luther K. Yoder, *Secretary*, 69 Pleasant Street, Ayer, Mass.

1896

As always happens, there was a plethora of material available for the first issue of the fall because of accumulation during the long summer interval, and then when the time comes, as now, for the second issue, material seems scanty.

Rockwell had a note from Billy Anderson in Cincinnati to the effect that Billy had passed the summer as usual at Biddeford Pool, Maine. He was feeling fine personally, but Mrs. Anderson had not been very well. Mark Allen had also been on a six months' vacation, but was back again on the job in Detroit. It was not clear what was the basis of Mark's vacation, whether he had been on a long pleasure trip, or had had a kindly disposed medical advisor who insisted that he take an enforced vacation. Rockwell also sees Fred Damon fairly frequently, and Fred is fit as usual.

It is pretty generally known that New England had a hurricane on Thursday, September 14, and the Hultman family has an interesting report on the storm. In the afternoon of that day Mrs. Hultman decided that she had no faith in the weather

forecast, so she rode with a woman friend to the Hultman cottage in Duxbury. Gene was on duty at police headquarters in Boston as a member of the state emergency disaster committee with some 20 boats loaded on trucks to be sent for rescue work. The department was fully alerted, and all of his Metropolitan Police force remained at their stations, the park, water and sewer labor force were held in readiness, and the portable frequency modulation sending and receiving sets on trucks were ready to move to any part of the commonwealth. This situation continued until 3:00 A.M. Friday, when the storm had passed and Hultman was relieved from duty by the governor. He then felt that he should get to Duxbury without delay, but found the drive of 35 miles not especially pleasant. There were many trees across the roads, but difficulties were surmounted and his destination reached about 4:30 A.M. Fortunately he found Mrs. Hultman all right, and nothing had happened to the house, except that it was plastered with salt, which blew nearly two miles across the marshes and later required careful removal with fresh water, as otherwise it would have destroyed the paint. Gene lost some very good old apple trees, and the destruction of two larch trees which he had planted himself was complete. On the Sunday after the hurricane, however, he was able to get a small tractor and tip back some 25 trees that he had planted which were tilted by the hurricane. These are now well guyed and propped up, and his hopes are that next year will show that many of them are saved. Altogether in the metropolitan park, water and sewer districts Gene had very little damage from this hurricane, as compared to the previous one of 1938, when on one system of parkways in the Middlesex Fells territory there were some 1100 trees across the roads. In this recent hurricane it was the personal damage to Gene that exceeded that of the previous one.

Harry Tozier in Rochester, N.Y., has had the house in which he was living sold over his head, so that he had to seek other quarters, and since he and Mrs. Tozier have had a desire to travel which was limited by the impact of the war, they decided to go south for the winter, making their first stop at Neptune Hall, Melbourne, Fla. Since they have never been to Florida before, their plans beyond that point are very nebulous and will depend largely on how they find that they like Florida and their surroundings and the general winter seasonal conditions there. — Dr. Chenery, who, as classmates may recall, gave up his house in Los Angeles to live in retirement on a rural delivery route out from Medford, Ore., has found that the many years which he spent as a city dweller unfitted him for country life, so that after experiencing country conditions of noise and insects he has definitely decided that his tastes are not rustic and is giving way to his yearning for the city. Henceforth he may be addressed at his old home at 3500 West Santa Barbara Avenue in Los Angeles. He admits that it is strange that a man born and raised on a New England farm should become entirely weaned from the country. Chenery reports that he is still carrying on in his retirement and so far has managed to keep out of the hospitals.

Elbridge Jacobs, who is now more or less foot-loose as a retired professor of the University of Vermont, took in the mineral industries meeting of the American Institute of Mining and Metallurgical Engineers in Boston on September 27 and 28, so that he and the Secretary were very much together over those two days. On the following day, Friday, Jacobs went off on the field trip to see various mining and preparation plants around Keene, N.H., for feldspar and mica, and then spent a week with his sister in southern New Hampshire before returning to his duties as state geologist in Burlington, Vt. — The Boston *Traveler* of September 20 showed a cut of a group of the Army 15th Air Force men in Italy, and one of the group was Captain Henry D. Grush, the son of our classmate.

It is with great regret that we announce the death of Charlie Lawrence, who, according to the report received from his son, Dr. Charles K. Lawrence '24, passed away quietly at his home in Baldwinsville, N.Y., on October 7. Charlie's health had been failing for a long, long time, and even at the time of our last reunion in 1941 he did not feel able to attend. In Charlie we have lost one of the outstanding figures of the Class, who was the ideal for loyalty and service. It was he who conceived the idea of the class scholarship fund and who really carried the major load in putting it through. It was he on whom we could always count for appearance at our five-year reunions, and who was always ready and willing to give his support in class and alumni affairs. He leaves a widow, a son, and a daughter. — Belated word has also been received of the death of Edwin C. Cramer, which occurred on October 10, 1943. He was graduated with our Class in the Department of Architecture and had followed the profession in Milwaukee until his retirement some years ago.

The paucity of news matter allows the publication of the following, which is the first of a series of stories supplied by Bob Flood and referring to individuals well known to the members of the Class. There was a man in our Class born with a silver spoon in his mouth, but it wasn't bright and shiny. After graduation he worked on the railroad for a time, and then he went back to his own home town, where he was born in sight of the site of the Statler Hotel, Detroit. He inherited a prosperous manufacturing business (cosmetics) and an assortment of assets, some real estate, and some bad loans. He had an uncanny ability of turning things into cash. I liked Mark Allen and always called him when in town. One day he said to me, "Why go to a hotel, Bob. I can put you up." So I called him. "Hello, Mark." "Where are you?" "At the station." "I'll be right down." We'd go to Cosmetics first, and then he'd drive me around to see my customers. I'd save a full day that way and we'd visit. He was a member of ten clubs, but I only made use of five. We always had to save out time to visit the Cemetery. I'd always ask Mark how business was at the Cemetery, and he'd say, "Dead," but the superintendent would say, "Fine, business is fine. People are just dying to get out here." You see Mr. Allen, Sr., had lent $20,000 on some acreage property out River Rouge way and got stuck with it. They turned it into a cemetery. When Mark took hold of things, he bought the adjoining piece — low ground — at a price. In the course of time Mr. Ford built his River Rouge plant, and the river had to be dredged. Mark was appealed to to let them dump on his ground. Sure, he said, if they would landscape it and pay 25 cents per scoop. Well, that was better than carting it away in wagons. Then the streetcar company wanted to cross his property, as the shortest way to the Ford factory. "Good idea," said Mark, "You do that . . . at so many thousand dollars a year for 20 years." He was collecting on that when I saw him last. He ultimately sold his property to the Cemetery. Call on Mark sometime when you are in Detroit. He likes to see Tech men. He is listed as retired, but you'll find him at Cosmetics from 9:00 to 9:15 ordinarily and at one to a dozen other places during the day. He's a hospitable cuss, doesn't smoke or drink openly, but otherwise he's O.K. Don't let him put you up at his house. That's for me. It would be lonesome, anyway, with the children gone. — CHARLES E LOCKE, *Secretary*, Room 8–109, M.I.T., Cambridge 39, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge 38, Mass.

1898

Your Secretary sent felicitations in the name of the Class to Professor Richards on his 100th birthday on August 26. — Two officials of the Harshaw Chemical Company were recently on business at the Institute and brought greetings to your Secretary from Walter Cleaveland, who is now in the engineering department of that company in Cleveland, Ohio.

We have received two more clippings telling of the retirement of our classmates after long periods of distinguished service. The Washington *Star* of May 5 reports: "Charles H. Godbold, engineer in charge of hull design drafting in the shipbuilding division of the Bureau of Ships . . . scheduled to retire from active service about November 1, the Navy Department announced . . . lives at Fourth street, Cabin John, Md. . . . Mr. Godbold has been in continuous service in the Navy Department for 45 years, and . . . Rear Admiral Edward L. Cochrane, chief of the Bureau of Ships, lauded his 'outstanding loyalty, attention to duty and his unfailing help to all his associates.' The retiring engineer was born in Boston, December 30, 1875, and was graduated from the Massachusetts Institute of Technology. He joined the drafting force of the Union Iron Works in San Francisco and later transferred to the office of the superintending constructor under the Navy's former Bureau of Construction and Repair. He came to [Washington] in 1908. He is married and has two daughters." Godbold will now make his home at 18326 Hatteras Street, Tarzana, Calif. — The *Jewish Advocate* of September 7 says: "After 41 years of service as an electrical engineer with the General Electric Company, Simon Fleischer of Woodside avenue [Winthrop] has retired. Mr. Fleischer has been a resident of Winthrop for over twenty years and is active in all civic and community affairs. He is a graduate of the Massachusetts Institute of Technology."

New addresses received are: Mary J. Thomson, V, care of Edith M. Canfield, Rural Delivery 3, East Stroudsburg, Pa., and Robert M. Vining, II, 108 Ralph Talbot Street, South Weymouth, Mass.; but the latter has moved only from Braintree, Mass.

We are very sad to report the death of several classmates. Allen H. Cox died on July 5. We quote the following from the Holyoke, Mass., *Transcript-Telegram* of July 6: "Allen H. Cox . . . nationally known architect and founder of the firm of Putnam, Cox & Saltonstall of Boston, died . . . in his home, West St., Granby. . . . Mr. Cox designed several of the buildings at Mount Holyoke college, the Jones Library at Amherst, also many fraternity houses at Amherst college in addition to other famous buildings in Boston and New England. For a long period he maintained a home in Cambridge but in recent years spent much of his time in Granby where he built a home four years ago. Frequently he traveled to his office in Boston.

"A native of South Hadley Falls, Mr. Cox was the son of the late Dr. Gardner Cox and Emma (Howard) Cox. He attended Holyoke high school, Williston academy and the College of Architecture at Massachusetts Institute of Technology. At M.I.T. he studied under the noted architect, Despradelle. From M.I.T. he went to the Beaux Arts in Paris for further study and stayed there for three years, was called back to this country when he won a nation-wide contest in architecture. In 1904 he established with William E. Putnam, the firm of Putnam & Cox and also taught for eight years at M.I.T. in addition to attending to his increasing business. The Animal hospital and many private homes in and about Boston were designed during this period. In 1916 he designed the Psi Epsilon House at Amherst, the first of a series of distinguished buildings of which the latest was the Jones Library. In these buildings and in none more than the library, he had expressed with grace, dignity and strength the spirit of the Connecticut Valley tradition. He achieved quality, distinction and aristocracy in building. Other prominent buildings he had recently designed were the American Unitarian Ass'n building, Bellview Hotel addition on Beacon Hill, Copley Theatre and the new Stuart St. apartment all in Boston and the new dormitories, Rockefeller and Hillside, the Skinner recitation building and the Clapp Science building of Mount Holyoke college and more recently the Amherst-Poshisha building in Kyoto, Japan.

"Mr. Cox was married twice. His first wife, Catherine Abbott, a famous portrait painter, died several years ago and his second wife, the former Blanche Brotherton, is a member of the faculty of Mount Holyoke college. . . . He is survived by his wife, one son, Capt. Gardner Cox with a camouflage unit of the Army; one brother, Frank G. Cox of Wilmington, Del.; one sister, Mrs. Raymond Tarr of Tacoma, Wash., and three grandchildren."

Raymond S. Willis died June 30 at his home, 1135 Hinman Avenue, Evanston, Ill. Willis had been vice-president of United States Rubber. He had also been vice-president of Huxley Willis and Company, Inc., export and import, a business which he organized together with E. H. Huxley '95. He had previously spent ten years in Mexico and five years in Spain. He assisted in the construction of the hydroelectric installation in the Pyrenees, which was one of the early high-tension, long-distance transmissions. He is survived by his wife, Wilhelmine Bayless Willis, a daughter, Mrs. Newell S. Knight, a grandson, and a son, Raymond S. Willis, Jr., a lieutenant in the Navy. — We have notice of the death of John W. Fleet on March 7. His last address was 469 Eastern Parkway, Brooklyn, N.Y.

John Goddard died on August 26 in Chihuahua, Mexico. Since graduation he had been connected with lead mining and smelting, first in Missouri, but for many years now in Mexico, where he was a well-known figure in mining circles. We clip the following from the New York *Herald Tribune* of August 28: "John Newton Goddard, mining industrialist of Mexico, died . . . at his home in Chihuahua, according to word received here yesterday by relatives. Mr. Goddard was born in Plainfield, N.J., was graduated from Massachusetts Institute of Technology in 1898, and passed most of his life in Mexico. Surviving are his wife, Mrs. Kathryn Turpin Goddard; a daughter, Mrs. Rafael Botello, of Chihuahua; two sons, Thomas Turpin Goddard, of Glendale, Calif., and Frederic W. Goddard 2d, of Ecuador; a brother, Frederic W. Goddard, of New York; and three sisters, the Misses Harriet and Elizabeth Goddard, of Plainfield, and Mrs. John F. Carlson, of Woodstock, N.Y."

George Hathon Watson died in Tucson, Ariz., on October 5. Watson's military service in Cuba in the spring of 1898 accounted for his not being graduated in Course VI with our Class. Frank W. Sharman of Consolidated Vultee Aircraft Corporation in Tucson sends us the following clipping from the Arizona *Star* of October 6: "George H. Watson, 70, a resident of Tucson since 1926, and formerly president of the Watson-Flagg Electrical Engineering Company in New York City, died . . . in a local hospital, after an illness of one week. Mr. Watson was a native of Paterson, N.J., and a graduate of the Massachusetts Institute of Technology. He was a veteran of the Spanish-American War. In 1900, he married Esther Kenny, of Brooklyn. From the time he ended his service in the army, until 1909, he was president of the Watson-Flagg Company. In 1909, upon resigning his position with the firm, he and his wife moved to Colorado, where they operated a ranch. In 1926, Mr. Watson came to Tucson, where he lived in retirement until two years ago. At that time, he went to work in the Consolidated Vultee Company's production engineering department. He lived on East Prince road. Surviving are his wife, and one brother, Harry H. Watson, of Corpus Christi, Tex. . . . Mr. Watson held memberships here in the United Spanish War Veterans and the Veterans of Foreign Wars."

The Secretary and Mrs. Blanchard expect to spend the winter months again at Bradenton, Fla., where their address will be Hotel Manavista. Sometimes the Secretary feels discouraged that classmates do not write in news about themselves, that all the news comes from clipping bureaus and indirect sources, and he wonders how many take an interest in reading the class notes. A recent letter from Dan Edgerly, commenting on class news and stating that he turned eagerly to the 1898 column when he received The Review, perked up the Secretary considerably. Conclusion: Send news of yourself or classmates to the Florida address until March 1. — ARTHUR A. BLANCHARD, *Secretary*, Room 6-421, M.I.T. Cambridge 39, Mass.

1899

Edwin F. Samuels, II, died on June 3 at his home in Severna Park, Md. After graduation he was for several years with the Lowell Machine Shops. He then became associated with the law firm of Phillips, Van Everen and Fish, of Boston. While there, he attended the Northeastern University Law School. He went to Washington, entering the United States Patent Office as an examiner in 1904, and continued his law studies at George Washington University, receiving his LL.B. degree in 1905 and M.P.L. in 1906. Arthur B. Steuart, of the law firm of Steuart and Steuart of Baltimore, invited Mr. Samuels to join him in 1907. On Mr. Steuart's death in 1914, Mr. Samuels formed a partnership with John E. Cross, who had also been with Mr. Steuart for some years, and continued the practice of patent and trademark law until the death of Mr. Cross in 1935, when he formed a partnership with Thomas W. Y. Clark. Mr. Samuels early made a name for himself at the patent bar in Baltimore, and for a long period of years there was scarcely a patent case that came before the local Federal Court in which his firm did not take an active part. His learning and skill made him widely known. In patent and trade-mark matters, he represented several of the larger industries of Baltimore.

In 1907 Mr. Samuels married Kate Tindall, daughter of Dr. William Tindall of Washington, D.C.

He was a member of the Severna Park Presbyterian Church, the Merchants Club, the Engineers Club, the Baltimore Ice Club, the American Patent Law Association, and the Baltimore City Bar Association.

Mr. Samuels is survived by his widow, his son, William Tindall Samuels, a lieutenant commander in the Navy, and a daughter, Mrs. Carl Morton Fellows, of Fitchburg, Mass.

When your Secretary was in Syracuse, N.Y., on October 17, he called up Bill Phalen, V, on the telephone and asked him to come across with a little personal history. Bill referred him to "American Men of Science," so here goes: ". . . B.S., Mass. Inst. Tech., 99, M.S. in 02 and Ph.D. 09, from George Washington. Austin Teaching Fellow, M.I.T., 01-02. Prof. chem. and geol, N.Mex. Sch. Mines, 99-01; asst. chem. and physical geol, U.S. Nat. Museum, 02-04; geol. aid, U. S. Geol. Surv, 04-07, asst. geologist and geologist, 07-16; mineral technologist, U.S. Bur. Mines, 16-20; consulting geologist, Solvay Process Co, 20 — Geol. Soc; Min. and Metal. Eng; Wash. Geol. Soc. Stratigraphy; petrography; rocks of Greenland and Virginia; iron ores; coal and clay resources of northeastern Kentucky; iron ores, barite and graphite deposits of Georgia; areal

and economic geology of Georgia, North Carolina and Tennessee; salt mining; geology and mineral resources of Johnstown, Pennsylvania; salt deposits and mineral resources of the United States." When the Secretary called on Bill at the Solvay plant about five years ago, Bill was on the point of retiring, but he hasn't retired yet. From the foregoing you will realize I am bound to get your record somehow. Save me the trouble of looking you up through the F.B.I. or otherwise.

Clancey M. Lewis, whose address is Route 2, Box 412, Renton, Wash., for 27 years manager of the Manufacturers' Association of Washington, was the dean of organization executives in that state when he tendered his resignation in 1941. He closed up his desk in 1942 with his resignation still pending. In 1943 his associates in the Senior Golf Association, which he had helped found, presented him with a resolution which mentions "administrative ability, high ideals, keen and unselfish interest, high standards of sportsmanship and fellowship, appreciation of personal friendship, character and many virtues." He and Mrs. Lewis are now living the simple life on their farm of 55 acres, on the east side of Lake Washington, 10 minutes from the heart of Seattle via the floating bridge, one of the outstanding achievements of the 20th century.

George E. Lynch reported in August that he had returned from a month's trip to Cuba, where he had studied the dust problems in the mining of iron ore and in the drying and roasting of the pulverized ore prior to leaching with ammonia for recovery of nickel. He flew from Los Angeles by American Airways and then by Pan American to Havana, finally traversing the length of the island to Santiago by the Cuban Nacional. On his return his priority was canceled from Miami to California to make place for wounded men, so that he had recourse to the railroad, traveling tourist on a first-class ticket. At Santiago he met classmate Juan Real y Gaillard, who is a leader in civil engineering at the eastern end of the island. Lynch drove down to El Siboney, where Juan was spending a few days on the coast. He spent some time at Cristo in the mill to concentrate manganese ore. He rode from Santiago to Antilla in an old Ford trimotor plane, and reports the smoothest and most comfortable plane ride of the whole trip. The old boat rode like a fine car on a paved highway with no bumps or drops. The dust problem at Nicaro is such that when the wind is right, the dust blows over the town and deposits a nice blanket of deep red color, and at times this dust gets to Banes, 12 miles away, where the United Fruit Company is located. Lynch left Nicaro by Navy bomber, an old Catalina, and got back to Miami in three hours. There he had to wait for three stifling hot days to get any accommodations to New Orleans.

William E. West died on April 1, according to a notice received by the Alumni Secretary. He was with Page-Hersey Tubes, Ltd., of Toronto, Canada, who have promised further details. Bill West, as I remember him, was captain of the company in which the Secretary was a buck private. If my memory serves me, the other officers were Harry Mork, lieutenant, and Lawrie Turner, sergeant. Correct me if I'm wrong.

Arthur Foote of Grass Valley, Calif., became a grandfather recently, according to the Boston *Herald*. The newcomer, Peter Abbott Titcomb, was born at the Faulkner Hospital, Boston. His proud mother is the former Janet Foote. — Colonel H. C. Greer of Morgantown, W.Va., President of the Greer Steel Company, has been chosen a Republican presidential elector-at-large.

C. H. Smith '05, I, makes a suggestion that seems well worth following. In writing the Secretary, he used the following form which, he says, if adopted by others, would eventually develop into a class history of those of us who have thus far outwitted the Grim Reaper. I am presenting this outline in the hope that you classmates will like the idea and follow it: (1) Date and place of birth. (2) Elementary education. (3) Course at M.I.T. (4) Professional or other work since graduation to date. (5) Technical societies. (6) Family. (7) Clubs, civic organizations, and so on. — Burt R. Rickards, *Secretary*, 381 State Street, Albany, N.Y. Arthur H. Brown, *Assistant Secretary*, 53 State Street, Boston 9, Mass.

1904

Although record of the death of Selskar Gunn was made in the November issue, an article taken from the September issue of the *American Journal of Public Health and the Nation's Health* gives a much more detailed account of his services to humanity and seems of sufficient interest to be included in these notes, as follows: "Selskar Michael Gunn, Vice-President of the Rockefeller Foundation, and Executive Secretary of the A.P.H.A. and Editor of the Journal from 1912 to 1918, died on August 2 at the age of 61. Mr. Gunn was born in London, England, where he attended Kensington Park College. In 1900, he came to the United States and was graduated from Massachusetts Institute of Technology with a B.S. degree in 1905. He received a C.P.H. degree from the Harvard-M.I.T. School of Public Health in 1917. From 1905 to 1914, he served the Boston Biochemical Laboratory as bacteriologist; the Iowa State Board of Health in the same capacity; Orange, N.J., as Health Officer; and Massachusetts Institute of Technology as an instructor and later a professor in sanitary biology and public health. From 1914 to 1916, he was the Director of the Division of Hygiene of the Massachusetts Department of Health. Mr. Gunn was Associate Director of the Commission for the Prevention of Tuberculosis in France, functioning under the auspices of the Rockefeller Foundation and French health authorities from 1917 to 1920. For two years thereafter he was adviser to the Ministry of Health of Czechoslovakia, and in 1922 returned to France to become Director of the Paris Office of the International Health Board of the Rockefeller Foundation, directing health work throughout Europe. He became Vice-President of the Rockefeller Foundation in 1927 and remained in Paris until 1932. From 1932 to 1937 he headed a Foundation program in China designed to reconstruct that nation's agricultural, educational, and health methods. He then returned to this country and engaged in Foundation work in New York. In 1941, the Foundation lent his services to the National Health Council to direct a three year study of voluntary health agencies in the United States. From January, 1943, to March, 1944, he had been lent by the Council to assist former Governor Herbert H. Lehman of New York, Director General of UNRRA. He served the Association as Vice-President in 1941, and at the time of his death was a member of the Governing Council."

Robert S. Hamilton has returned to his old home state of Montana after having lived for some time in California and elsewhere. He is getting back to professional mining by opening three groups of copper mines in a small way, bringing them to the stage where they will warrant further prospecting by diamond drilling. He is the sole owner of all three groups, and they keep him busy. For one group he has the promise of diamond drilling. For the second group the government has built a road of access, and at the present time some ore is being mined to add to the nation's copper supply. Hamilton is enthusiastic over the prospects and feels that one of them may develop into a large copper producer.

George B. Harrington has given us some highlights of his life. When he was graduated, he had plans for a summer trip to Alaska with C. A. Hardy, his classmate, but a job was open in Mexico with the Velardena Mining and Smelting Company, and he took it, stopping off in New York a short time for intensive study of Spanish. He carried on in Mexico for several years, but after the San Francisco earthquake he took a temporary post with the Seattle Electric Company, a firm which was under the management of Stone and Webster, with whom he has been associated ever since. The Seattle Electric Company had some small coal mines, of which Harrington became general superintendent. Later, Stone and Webster sent him to report on an old coal mining company in Illinois, where he stayed through the reorganization, becoming president of the new corporation, the Chicago, Wilmington and Franklin Coal Company, as such making a wonderful record for his company for over 30 years.

R. E. Dimock, who has been for many years with the Dominion Coal and Steel Corporation in Sydney, Nova Scotia, underwent an operation during the summer. By September he was at home, rapidly convalescing with the assurance that a long-standing trouble was removed and general good health again ahead of him.

W. B. Boggs is making records in smelting copper ore at the Noranda mine in Quebec. In the United States the average tonnage per day for a reverbatory furnace the size of his is from 800 to 1,000 tons. Because of shortage of labor he has had to push things, and his furnace is now handling 2,000 tons of ore a day.

Your Secretary was married on October 12 to Miss Ruth Robinson of Allston, Mass. The ceremony was conducted by the Rev. Samuel W. Lindsay, pastor of the Brookline Baptist Church, in the chapel of that church on Beacon Street in Brookline. It was attended by only a few close friends of the bride and groom. Best wishes to you all for the most enjoyable holiday season which the present times permit. — Henry W. Stevens, *Secretary*, 1960 Commonwealth Avenue, Brighton 35, Mass. Amasa M. Holcombe, *Assistant Secretary*, Apartment 403, 3024 Tilden Street, Northwest, Washington, D.C.

1906

The Secretary received a letter from George F. Hobson announcing his retirement from the Army on account of disability. The letter was written from his mother's home in Brookline, Mass., where George was living until the time he could take up residence in Burlington, Vt., where he intends to make his permanent home. Relative to this the following is taken from a Lowell, Mass., paper: "Ending a military career of 27 years, Col. George F. Hobson, native of Lowell and member of a family which has for more than a century figured in the development of this city, retires this month at Camp Lee, Petersburg, Va., after a meritorious record of responsible service through two wars. Born in Hank Street, Col. Hobson is a son of Mrs. Charles H. Hobson, formerly of Holyrood Avenue and now of Brookline. He is a brother of Frank F., Charles and 'Ted' Hobson, all prominent in heating engineering and mill supplies circles. His father, the late Charles Hobson, was for many years head of the Hobson and Lawler Company, and long time President of the Lowell Tuberculosis Association. A graduate of Massachusetts Institute of Technology, Col. Hobson pursued a career in civil engineering until 1916, when he attended Officers' Training at Plattsburg, N.Y., where he received his first commission in the Engineers' Reserve Corps in January, 1917. An interesting footnote to his service record of more than a quarter-century is the fact that his first assignment was to the 305th Engineers, 80th division, then stationed at Camp Lee, from which he retires this month following duty on two continents. When the 80th division went to France in the First World War, Lieut. Hobson entered immediately into the Albert and Somme offensives and the Lowell officer was gassed in action. In 1918 Lieut. Hobson ascended to the rank of captain and then to major, returning in the latter capacity to Fort Humphreys, now Fort Belvoir, as a training officer. After the armistice, he resigned his commission and returned to civilian life, but apparently the Army was in his blood, for in two years he accepted a permanent commission as captain in the construction service of the Quartermaster Corps, and went to Germany to serve with the American Army of Occupation. His achievements overseas resulted in his appointment as plans and training officer in the office of the quartermaster general, where he served until 1924. The war department then named him to the general staff, and he served at Fort Humphreys and at the Schuylkill arsenal in Philadelphia.

"In the intervening years between the two great wars, Hobson served in many interesting capacities. He spent another year overseas as a member of the American Battle Monuments Association, representing the United States in the solemn assignment of establishing recognition of the deeds and sacrifices of the boys who left in 1917, never to return. He was praised for the thoroughness of his work, and on completion of this assignment, was sent to the staff and faculty of the U.S. Army Quartermasters school. While assigned to the school on special duty at Fort Dix, N.J., Col. Hobson witnessed the explosion of the Zeppelin Hindenburg at Lakehurst Naval Air station. He was standing near 50 enlisted men, observing the mooring of the Zep, when the huge air ship burst into flames and broke in mid-air. Promptly organizing the enlisted men, Col. Hobson directed rescue and police work in such manner that he received a citation from Admiral William D. Leahy, Presidential Aide who was then Assistant Secretary of the Navy. In 1939, when the Army gave attention to the strengthening of the Panama Canal Zone defenses, it sent Col. Hobson to the Isthmus to supervise the construction of barracks, quartermaster's buildings and other facilities for thousands of soldiers. Successful in that task, he was next sent to Boston as Construction Quartermaster for the New England area. Still later, Col. Hobson returned to the school at Philadelphia as Commanding Officer of the troops, charged with the responsibility of military training of cadets. Moving then to Camp Lee, Va., Col. Hobson served as Executive Officer, and coordinated administrative efforts during the period of the vast expansion of that camp's training program. Ill health finally overtook him, and he spent some months as a patient at Walter Reed General Hospital in Washington. Married to the former Clara Francis, granddaughter of Col. James B. Francis, designer of the famed Francis Gate which saved the city from a flood disaster in 1936; Col. Hobson has two sons in the service. George F., Jr., a civil engineer by profession is with a naval construction battalion in the Pacific and John, 21, is in the European theater as a private with the U.S. Army Engineers. Local advices say that Col. Hobson will spend his retirement in Burlington, Vt." F. A. Benham and the Secretary had the pleasure of taking luncheon with George on October 20. George seemed to be in excellent condition for one retired for reasons of disability.

The following is an extract from a sketch of the life of W. P. Terrell which was submitted by Professor Locke, who in turn obtained it through the Technology Christian Association. As Professor Locke states in his letter of transmittal, it is an interesting account of one of our former negro students, who has done very well: "I was born at Fort Worth, Texas, on March 1, 1884, the first son of Isaiah M. and Marcelite L. Terrell. My father was principal of the colored high school at that place. Finishing high school in 1901, I entered the Kansas State College of Agriculture and Applied Science. Upon completing the course in mechanical engineering in 1904, I entered the Massachusetts Institute of Technology, where I finished the same course in 1906. I took one year of work in Architectural Engineering at Technology in 1910–1911. In August, 1938, I earned the degree of M.S. in trade and industrial education in the Colorado State College of Agriculture and Mechanical Arts, at Fort Collins, Col. I was married on August 26, 1914, and am the father of three children — two boys and a girl. The boys are in the armed services and now in England. One is a second lieutenant in the Engineers and the other is a staff sergeant in the Quartermaster Corps. The girl has finished at Tillotson College and holds a Bachelor of Library Science degree from the University of Denver. She is married and is a librarian-teacher at Booker T. Washington High School in Houston, Texas. One of the boys lacks one quarter for securing a Master of Science degree in history from the University of Colorado. My father was principal of Prairie View State Normal and Industrial College from 1915 to 1918, and afterwards President of Houston College (Baptist) from 1918 to 1922. He was then connected with hospital work at Houston and finally got $80,000 from Mr. J. S. Cullinan to erect a building and three city blocks, given by the city, for the site. My mother passed away in 1924, and I returned to Texas from Lincoln University at Jefferson City, Mo., to help my father put over the program and served in the meantime as an employee of Windham Brothers Construction Company. I afterwards did work in building for myself and in teacher training also at Prairie View from August, 1931, to September, 1942. I accepted the position of superintendent of the mechanical department in October, 1906, and served until September, 1921. During those 15 years, I was responsible for the teaching in the mechanical division, for the buildings and utilities on the campus, and for any other extra work in the line of engineering. The department grew from three to fifteen men, three of them with a rank of assistant professor. I have since turned out some young men, one of whom succeeded me as head of the mechanical division.

"After 1921, I served with a service engineering and construction group at Atlanta, Ga., where I should have developed a construction business, but the company was improperly financed. I went with Windham Brothers Construction Company of Birmingham, Ala., the largest Negro firm in the country, estimating and supervising buildings at Birmingham, Shreveport, and Tyler. I then started in business for myself in Beaumont and Houston, Texas, furnishing complete services, including finance and construction, but the building slump overtook the work of our firm, and I became a teacher of drawing at Houston and undertook the work of teacher-trainer in industrial education at Prairie View, where I served for 11 years. I was later instructor of soldiers of the Engineers Corps for Virginia State College at Ettrick, Va. This was followed by a month at Florida Agricultural and Mechanical College at Tallahassee, giving special instructions to the teachers on the war production training program. The work was conducted under the guidance of the director of industrial education of the state of Florida. I have since been connected with the National Bureau of Standards as assistant mechanical engineer." If the Secretary had as complete a record of other classmates as this one of Terrell's, he might be encouraged to start the class book which has been mentioned from time to time.

Fay W. Libbey, mining engineer with the State Department of Geology and Mineral Industries, 702 Woodlark Building, Portland 5, Ore., has been appointed acting director of the department, upon the resignation of Earl K. Nixon late in April. Libbey has had charge of the department several times during the absence of Nixon and has been with the organization since 1937. — Russell P. Raynolds '06 reports that ever since leaving the Institute he has been with the American Smelting and Refining Company and for the last 15 years has

been manager of the Colorado department of that company.

The Secretary regrets to report the death of Burrows Morey, who died suddenly in Monterey, Mexico, on May 13, while en route from Buffalo to his home in Mexico City. He and Mrs. Morey were returning from a visit to Mrs. Morey's sister's in Buffalo. The following short sketch of his life is taken from the Buffalo, N.Y., *Courier-Express:* "Born in Buffalo, Mr. Morey was a graduate of Fosdick-Masten Park High School and the Massachusetts Institute of Technology. Superintendent of the soap products department of the Larkin Co. for 25 years, he later became associated with the sewer authority, where he remained until two years ago. At that time he moved to Washington to accept a position with the Federal Economics Administration and last year was assigned by that agency to Mexico City. Actively interested in Masonry, he was a past master of Ancient Landmarks Lodge, 441. He also was a member of the Rotary Club and the American Institute of Chemical Engineers. Surviving are his wife, a daughter, Mrs. William P. Vogel, Jr., of Forest Hills; and two sisters, Mrs. Matthew Weber of Salamanca and Mrs. James P. Carter of Baltimore, Md." Early in June the Secretary received a letter from Jack Norton including some information pertinent to the passing of Burrows Morey. Jack also included a personal word to the effect that he had two sons in the service — one, a lieutenant (junior grade) in the Navy and the other a private in the Cavalry, the latter having seen fighting in the South Pacific Islands.

The New York *Times* of June 15 announced the wedding of Charles Stanley Wetterer, a major in the Army Air Forces, to Paula Tuell, daughter of Mrs. Samuel Bennett Tuell of 440 Park Avenue. Major Wetterer is a son of our former classmate, Charlie Wetterer. Shortly before the wedding he had returned from active service in Africa and Italy, where he had been since November, 1942. He attended Taft School and is an alumnus of the Institute and the Graduate School. Miss Tuell was graduated from Brearley School and Smith College and is a member of the Junior League. Her late father was a former vice-president of the Engineers Public Service Company, Inc. — Fred Goldthwait, Secretary of 1905, writes that one of his classmates, Walter G. Bent, who is with Kodak, Ltd., London, England, reported a surprise visit from the son of an '06 man, namely, H. P. Carruth, Course V. Young Carruth is a sergeant, and the last we heard H. P. Carruth, the father of the young man in question, was with the Union Bag and Paper Corporation in New York. — A card from Henry Ginsburg announces the birth of his second grandchild, Leslie Ann Gaynor, who was born on June 6.

One or two items from the address changes will be of interest. Howard P. Barnes is now residing at Plymouth, Mass. W. G. deSteiguer of Alexandria, Va., has been promoted from major to lieutenant colonel. Also, notice has been received of the death of William F. Walker, II, on October 9, 1943. No further details are available; the last record of Walker indicates that he lived in Lawrence, Mass. — Classmates will be sorry to learn of the death of Mrs. Kasson, wife of Charles L. Kasson, VI. Charlie is now living in Milton, Mass. — James W. Kidder, *Secretary*, Room 801, 50 Oliver Street, Boston 10, Mass. Edward B. Rowe, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills 82, Mass.

1907

To the letter that I quoted in The Review for November from Stuart Godfrey (Brigadier General, U.S.A., Air Engineer) I replied, and as a result received from him another letter dated September 15, also written from Headquarters China-Burma-India, Air Service Command, A.P.O. 671, Care of Postmaster, New York, from which I quote: — "I am just back from a five-day trip to China, during which time I inspected our China fields for B-29's, saw the Big Boys take off on their recent successful raid against Anshan, hugged a trench when the airfield I was on was itself raided, saw Generals Stilwell and Chennault, and returned for my 18th passage over the Hump. . . . On the way up I accompanied Major General LeMay, the new commanding general of the XX Bomber Command. He has just come from England, where he has achieved a great success in the operations over Germany. I admired the quiet, forceful way in which he took over and carried out his first mission. . . . Up at 3:30 A.M., and at dawn was watching the big super-Fortresses thunder down the runway and lift gracefully into the air — a thrilling sight. The results of the raid have been announced — how a hundred planes in daylight dropped their bombs squarely on the coke ovens which manufacture one-third of the coke on which Japan's steel industry depends. Before dark the planes were back, almost all of them, the few that were missing have been forced down in friendly territory from engine trouble rather than enemy action. . . . I can't say much about the raid on us except that we had plenty of warning, time to dress and get a bit away from the field by the time the bombs fell. The few Jap planes that came over did little damage. . . . I remained with General LeMay's party when he paid his respects to General Stilwell next day, then left him to go to Chennault's headquarters for a talk with him and Hank Byroade, our able young chief engineer in China."

On October 26 Phil Walker, maintenance engineer of Whitin Machine Works, called me at my office at the same company to say that when in Boston at the Office of Price Administration a few days before he had found that Emerson H. Packard, very prominent in our Class during undergraduate days, has a responsible job with that government agency. On October 27 I talked with Pack on the telephone and learned that for several months he has been located at 55 Tremont Street, Boston, as regional solid fuel price specialist at the retail level for O.P.A. He and his wife are living at 285 Summer Street, Malden, Mass. — Alexander Macomber has been designated director of the new gas division of the War Production Board.

Through the courtesy of Charles E Locke '96, I have a memorandum regarding Arthur O. Christensen, III. Arthur followed the mining profession for a while in the gold and silver districts of Canada, but circumstances made him quit and return to his native city of Beaufort, S.C., where he has been a land surveyor and realtor and a very useful citizen. He owns many of the best ocean beach properties in the section.— I have a printed folder, being a reprint from "Technology," 1943–1944 edition, published by the Technology Club of Chicago, containing an article by John Frank, President of Ilg Electric Ventilating Company, entitled, "This is Really an Air War," setting forth the manifold uses of ventilating equipment in all branches of the armed forces on sea and land and in the air. Without doubt John would send you one of these if you should ask him. — Bryant Nichols, *Secretary*, 23 Leland Road, Whitinsville, Mass. Harold S. Wonson, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

1909

John E. Otterson, XIII-A, Annapolis 1904, in 1941 was appointed co-ordinator of ship repair and reconversions by the Navy and Maritime Commission. Later, he became president of East Coast Shipyards, Inc., operating at Bayonne, N.J. This past July he testified before a special House Committee on shipyards that since February 2, 1943, his company had constructed the equivalent of 17 boats and had repaired 542 ships, to a total of $8,000,000 and had disbursed a total of $18,000,000, and that the program laid out by the Maritime Commission for his company was 64 per cent completed. Under Otterson's direction, a design staff of 100 had designed 24 tankers besides redesigning a number of other ships.

Frank W. Sharman, IV, writes from Tucson, Ariz., as follows: "I regret that I did not answer your inquiry of May 8 with a respectable letter explaining the reason for not being able to attend the 35th reunion. If the reunion was held in New London, you had a colorful setting and, I am sure, a wonderful time. The coast of Connecticut, all the way from Watch Hill, R.I., to Saybrook, used to be one of my old stamping grounds, and although I have never eaten a meal at the Griswold, I have left my shadow at the Crocker House on many an occasion. My headquarters were at Mystic, and the principal diversion sailing; although bathing, fishing, and picnicking were occasional side issues. The New England hurricane of September, 1938, may have caused radical changes in the Connecticut landscape, but the urge is still there to return to the old haunts of yesteryear. Let me know of any future meetings of the Class. . . ."

Reg Jones, VI, has just been made vice-president of the Bell Laboratories and explains as follows: "In my new post as vice-president of Bell Telephone Laboratories I am succeeding Otto B. Blackwell '06, who is taking an important post with the American Telephone and Telegraph Company. My job is to oversee the work of the staff departments in legal and financial matters and in those dealing with accounting, personnel, and publicity; I also consider the problems relating to our present and future buildings. As you know, my former work was concerned with a portion of the technical program of the laboratories. I have been director of apparatus development since 1928. More recently, I have been generally responsible for our program of war work in underwater sound and naval ordnance. This portion of my previous work has now fallen

to another Tech man, W. H. Martin '11, who has been newly appointed assistant director of apparatus development of Bell Laboratories." It's a great honor to be asked to take so important a position, and the Class extends its congratulations. The Review Secretary recently met Reg in New York at a committee meeting of the American Institute of Electrical Engineers and there conveyed his personal congratulations.

Word has been received that Arthur C. Judd, XIII, a lieutenant colonel, is one of the several Technology members of the Army Transportation Corps in the European theater of operations who are rushing replacements and supplies to the battlefields of France. Members of the Corps are engaged in a multiplicity of transportation operations on the highways and railways of Britain and the Continent. — For a week or so in October Paul felt real groggy as a result of a cold and other difficulties, but according to last reports was "feeling like something." During the summer, as usual, he spent several weeks at the Isle au Haut, stopping en route at Cambridge to visit the Review Secretary. He submits a true Wiswallian description of the Isle, which in itself makes us all want to visit it next summer.

"It seemed almost like another world up there on the coast of Maine. The place I like best is Isle au Haut, an outlying island about half way between Rockland and Bar Harbor. I went there first in 1924 on a hunch that I got from Ike Hazelton '94, IV, who loved the Isle. I stay with the family of Stanley Dodge, in those days a lobster fisherman. In the Dodge family that first year was a tiny son, Stanley, Jr. Today, Stanley is well cast in a radar outfit in North Africa. I've just sent him a watch with a nonmagnetic hairspring; no other type will keep time among the strong magnetic fields of Stanley's outfit. The thing that will always make that boy part of my life is a suppressed desire that he has cherished ever since he could row his "peapod," as they have so aptly named their small boats — which was about as soon as he could walk. Until now, he has hugged the hope that some day he could get me into his peapod, row me out to a rock a mile offshore that is just awash at dead low tide, get me ashore on that rock by some vile subterfuge, and then row like the mischief back to shore, leaving me to contend with those noble 10-foot tides of the gulf of Maine! Now I'm no Johnny Weismuller! I can swim, if not too far nor too long. But I tremble to think of trying to swim a mile to shore from a rock that was being submerged 10 feet deep by the incoming tide. . . .

"Newspapers do not mean much to the year-round residents of the Isle. But nearly all the men sit glued to their radios nightly from Lowell Thomas at 6:45 until Gabriel Heatter at 9:00. That gives them all the news. Even so, the city seems far away on that beautiful Isle. Seven miles long and two wide, the Isle resembles at a distance one of those humpbacked Komodo lizards that took up so much space in our papers a few years ago. There is the long neck and head, the high back, and the elongated tail. The open ocean washes its shores. The water is so clear and so blue and so free from any taint of the city that I can only liken that crystal sea to the Pacific as I saw it north of Hawaii, when we were nine days out from the Golden Gate and had nine more to go to Tokio Bay. An 85-year-old white church with a slender, tapering spire stands up above the main road along the shore — a landmark outlined against the dark green of the spruces and pines that cover the sides of Mount Champlain, which was named for the French explorer who sailed down the coast of Maine in the early 1600's. In the church hangs a service flag with five blue stars, the most poignant sign that Isle au Haut is not detached so very far, after all, from the unhappy world of today."

The Silver Star, "for gallantry and intrepidity in the line of his profession as Flag Lieutenant on the Staff of a Transport Division," was awarded Laurens D. Dawes, a lieutenant commander in the Navy. The foregoing quotation is part of a citation by Admiral Nimitz. The action for which the award was made took place in November, 1943, during the attack on Tarawa Atoll in the Gilbert Islands. — On September 17, a daughter, Joanne Davis McClennan, was born to Captain John H. McClennan, AUS, and Mrs. McClennan (Jane Dawes). (Johnny Willard, please note.)

All of us are aware of the Alumni Fund, by which the Institute is attempting to meet operating expenses with voluntary contributions from its Alumni. This year the goal is $150,000, of which our quota is $2,710. So far the amount received is only $1,682.64, or but 62 per cent. Moreover, only 100 of the quota of 118 individuals, or 85 per cent, have contributed. The list of contributions by classes is published from time to time by the Alumni Association, and out of pride alone we do not want to see 1909 way down in the percentage ratings. The Class of '94 is already 244 per cent subscribed! Many have probably just forgotten. The contribution goes along with the Review Subscriptions. Attend to the matter right off, and remember that contributions can be deducted from Uncle Sam's taxes.

We are glad to hear again from Clark S. Robinson, X, (or Robby), who is a lieutenant colonel in the Ordnance Department (see The Review for May, 1943). He writes: "It may have been a long time since we struggled with spathic iron ore in Bill Hall's lab, but it hasn't been quite so long since I took leave of absence from the Institute to go on extended active duty with the Army. The story goes something like this: More than 20 years ago, some of the people in the Army decided that in view of the approaching war (a low-powered telescope was all that was needed to see it coming), the Organized Reserves ought to be padded with some technical talent; hence a drive was made at the Institute to get some of the staff to join the Reserves. Having seen the technical, among other, difficulties of the Army during the then recent war, I fell for the idea and signed up as a major in the Ordnance Reserve, giving as my military experience one year of freshman drill in the old South Armory with E. Q. Adams as one of our lieutenants.

"Once in, I played the game according to Hoyle and after serving my time as major, wrote a thesis, and passed an examination, and was promoted to be lieutenant colonel, which grade I have held for 10 years, taking as much part in pre-war planning as time and opportunity permitted. Having served my time as lieutenant colonel, I turned the crank again, wrote another thesis, passed another examination, and was certified for promotion to the grade of colonel, but just about then this new war began, and all peacetime rules went out the window, including my promotion; so I'm still vegetating along in the present capacity and having a most interesting time doing it. When, in 1942, the Reserves were called out, I tagged along, reporting for duty with the Boston Ordnance District, where I held forth for a year or more as a sort of consultant on chemical engineering. I was then moved to this station in Chicago, where I am doing the same sort of work for the safety and security branch of the Ordnance Department. Our job is to keep our friends from blowing themselves up, saving all explosives for the benefit of our enemies. Like most profs, I contracted the book-writing habit, and even active duty hasn't cured me. Since being on this job, I have been guilty of three books along military lines and, in hopes that I can sell another copy or two, I'll give their titles — *Thermodynamics of Firearms*, *Explosives Chemistry for Safety Engineers*, and *Explosives — Their Anatomy and Destructiveness*. Believe it or not, still another is going through my hands at present writing. It's an incurable disease, I'm afraid. I promised some of the boys to show up at the reunion this year, but couldn't make it. Better luck next time." — PAUL M. WISWALL, *Secretary*, 90 Hillside Avenue, Glen Ridge, N.J. CHESTER L. DAWES, *Review Secretary*, Pierce Hall, Harvard University, Cambridge 38, Mass. *Assistant Secretaries:* MAURICE R. SCHARFF, Apartment E 227, 3860 Rodman Street, Northwest, Washington 16, D.C.; GEORGE E. WALLIS, 1606 Hinman Avenue, Evanston, Ill.

1910

From Carl Lovejoy and Carroll Benton I received the following notice of the passing of D. C. McMurtrie, as published in the New York *Herald Tribune:* "Douglas C. McMurtrie, director of typography of the Ludlow Typograph Company and designer of modern typography for more than 100 daily newspapers, died of heart disease [on September 29] in his home in Evanston. He was fifty-six years old. A native of Belmar, N.J., and a graduate of the Massachusetts Institute of Technology, Mr. McMurtrie was editor of 'The American Journal for the Care of Cripples' from 1912 to 1919, director of the Columbia University printing office from 1917 to 1919 and director of the Red Cross Institute for Crippled and Disabled Men, New York, in 1917 and 1918. He joined the Condé Nast Publications in 1921 and helped design and build the company printing plant at Greenwich, Conn. Two years later he became editor of 'Arts Typographica' and in 1925 came to Chicago as director of typography for Cuneo Press. He joined the Ludlow Company in 1927. Mr. McMurtrie was author of 'The Book, the Story of Printing and Bookmaking,' 'Wings for Words,' the life story of Johannes Gutenberg, father of modern printing, and numerous monographs on modern typography. He also wrote extensively on care of the crippled, especially the wounded of the first world war."

Early in October I received the following letter from Frank Bell, written from some-

where in France on paper apparently salvaged from a former German command post: "This is a short postscript to my former note for The Review, written in a rush from somewhere in France. In the middle of an attack on a certain city we are now trying to repair a large railroad bridge and de-activate the vicinity of mines and booby traps. Behind and around us the artillery is raising hell; the 50-caliber machine guns and infantry are popping away in front, to say nothing of the intermissions being filled with a violent pounding from our aircraft. It's a wonder to me how Jerry can take it. This has kept up, off and on, for three to four days; but the German troops are SS and paratroopers and shoot any poor devil they can catch trying to surrender. They are fanatically tough. They are also devilishly clever on mine field and booby trap work. One has to be very careful. Some men were blown to bits where I was walking the other day. Hope my luck holds. This is about all, except that the old man stands it well — sleeping under a pup tent, when sleep can be had, being wet and dirty most of the time, and living on K and C rations. It's surprising what one can take. When I get out of this mess, I'm first going to take about three baths; then I shall eat some raw clams, half a dozen raw oysters, a lobster, a boiled chicken, a big thick steak, cooked rare, with mushrooms on it, an alligator pear salad, and some apple pie alamode, meantime filling the voids with sauterne and champagne, topped off with benedictine. Then I am going to sleep for about 24 hours. How does that sound? My regiment is doing a fine job."

The following is a letter from Carl Lovejoy: "I have been on a long vacation, and the war is over as far as my military service is concerned. In fact the last year has seemed quite remote from any direct contact with military work. I wish I could have gone across on some of the construction work, but they seem to think we are too old. They may be right. I am going back with the War Department on flood control planning. I hope we do build a few dams on the Connecticut Basin. I should like to get in a few more years of government service and then retire. I have a very nice place 10 miles out of Providence — 2½ acres near the water — and have enjoyed being at home the last six weeks."

Curtis C. Webb writes that although he lives in Louisville he manages a trip to Los Angeles nearly every year to visit his mother and at the same time plans to see Bob Breyer. After the last war he went into the oil business in Louisville and followed that line of endeavor until the depression. Since then he has been doing consulting work and at the present time is associated with the Oscar Ewing dairy interests. — Herbert S. Cleverdon, *Secretary*, 117 Grant Avenue, Newton Center 59, Mass.

1911

In September we reached our quota of 125 subscribers to the Alumni Fund, being the first since the class of 1896 to do so. But we still have to bow to 1912 in the matter of generosity, for they have 77 per cent of their amount quota to our 72 per cent. M-m-m-m. — Before these notes appear, another "Seven Come Eleven" party will have become history, as Walker Memorial is now available for occasional get-togethers — watch for the story in next month's class notes.

"You have come to college to make yourself of some use to the world," said our own Carl Ell, XI, President of Northeastern University, as he addressed a record group of 411 freshmen at their opening convocation this fall. "You have an opportunity to write a new record for yourself — to give new meaning and new content to your name." This new class also contained the largest group of coeds in the school's history — more than 100.

When you saw that fine likeness of General MacArthur on the cover of that late October issue of *Time*, undoubtedly you turned at once, as I did, to the story, "Battle of the Pacific." But if you didn't, get a copy now. There you'll find a splendid candid camera shot of our own lieutenant general, captioned, "KENNEY — HE saw runways in the grass." Describing MacArthur's career, the article says: "But when Brett's airmen failed to stop a landing at Buna and Gona in New Guinea, Brett was relieved; MacArthur asked Washington for someone else."

"General 'Hap' Arnold," it continues, "picked George Kenney from behind a desk and sent him to Australia. 'Sir, I am your airman here,' said brisk, bantam-sized Kenney when he reported for duty. MacArthur liked Kenney's drive and cocksureness, was soon calling him 'George.' Kenney, an airman's airman who was getting his first chance to prove it, liked MacArthur, especially when the General turned him loose to run his own air show without interference from groundlings. Like most ground generals of his day, Douglas MacArthur was not notably appreciative of the potentialities of air power. But he had flexibility of mind, and he learned.

"Kenney fitted his new team swiftly into MacArthur's strategic plans. His first achievement was to fly a regiment of U.S. troops from Australia to Port Moresby, when the Japs were within 28 miles of pushing the Allies out of New Guinea. These troops helped the Australians to drive the enemy back across the Owen Stanleys. Then Kenney told the Chief he could fly soldiers in greater numbers across the mountains to Buna and Gona, land them there on strips cut out of the bristling kunai grass. 'But damn it, George, you'll kill them all,' protested the General. Kenney said he was damned if he would! MacArthur was convinced. The bantam moved in men, ammunition, food, vehicles. MacArthur's coastal campaign was set. Kenney's combat airmen grew at their jobs. Their greatest victory was the Battle of Bismarck Sea, where they sank every one of 22 ships in a Jap convoy headed south to reinforce the dug-in forces in the bitter fighting around Buna and Gona. . . ."

Near the end of the article we find: "The Douglas MacArthur who landed at Leyte last week had written an extraordinary chapter in personal experience as well as in public service. Past 60, with a crack record behind him, he had had to prove himself all over again. He had done it. Now, beyond the retirement age (64), he was still learning his art, still finding new plays for his battle-tried team in which Sutherland and the three Ks (Krueger, Kinkaid and Kenney) functioned as smoothly as the Naval Observatory clock in Washington. It was a winning team, and Douglas MacArthur had made it so. . . . Lieut. General Kenney surveyed the airstrip possibilities as the beachheads were deepened and MacArthur announced: 'We are now commencing the preparation of a great base for all arms for future operations.'" We're proud of you, George.

After luncheon one noon Sara and I were sitting in the lobby of the Colonial Hotel, here in Gardner, and who should appear on the scene but Bill Hodgman, II, and his wife. Bill, who heads Hodgman Manufacturing Company in Taunton, Mass., was on a business trip, and his wife was making the rounds with him. Both the ladies agreed that June, 1946, can't come any too soon to suit them — imagine that; we'll be 35 years out at that time.

Ted Van Tassel, X, sent me a very interesting copy of a recent issue of "The Gruber Guidon," published at Camp Gruber, Okla., where Ted is now attached to the hospital reconditioning annex. This illustrated article states: "One of the newest programs the Army has instituted for the soldier's welfare is now in full swing here and all kinds of cases — injured, surgical, medical, orthopedic — are helped over the last stages of the road to complete recovery by most up-to-date methods. . . . Major Edward Van Tassel, commanding officer, is a graduate of the School of Special Morale Services in physical training and educational reconditioning. . . . The purpose of these reconditioning courses is to avoid the slump that a patient gets into when he sits around a hospital after certain accidents or operations and from 50 to 75 convalescent soldiers enter Annex each week to undertake individualized courses that average from two to six weeks, before returning to full duty." Ted is most enthusiastic about his work, he writes.

In late October George Cowee, III, was again called to Gardner on a sad errand, for his mother, a fine old lady of 84, died suddenly. I expressed sympathy to George both for myself and for the Class. — Another of our score of active members in the armed services is at a new assignment — O. Robert Schurig, VI, a lieutenant colonel, is now in the ballistic research laboratory at Aberdeen Proving Ground, Md. Bob had formerly been centered, as in civilian life, at Schenectady, N.Y. (General Electric Company). I have two more new addresses from the Alumni Office: Thomas R. Lathrop, VII, State Department of Health, Columbus, Ohio; and Sidney A. Patchett, 16 Franklin Street, Marblehead, Mass. It's still a bit early, but as always sincerest greetings to all classmates from "Dennie and Jack." — Orville B. Denison, *Secretary*, Chamber of Commerce, Gardner, Mass. John A. Herlihy, *Assistant Secretary*, 588 Riverside Avenue, Medford 55, Mass.

1912

It is with great regret that we learned of the death of H. Chester Damon, IV, who passed away on September 1 at his home in East Paterson, N.J.

Harold R. Fox, III, who is general manager of the Jamaica Government Railway, with offices in Kingston, Jamaica, wrote on August 20 that their side of the island had suffered serious damage from a hurricane

and that he was very busy clearing up the debris and restoring communications. Fox's eldest son, Charles, is now in his third year at McGill University, studying civic engineering; and Fox's two daughters are in England — one, a nurse in London. On a short trip to the States last year, he spent most of his time in Washington in an endeavor to obtain locomotives and rolling stock, which he was fortunate to obtain.

Charles A. Cary, I, has recently been made manager of the nylon division, E. I. du Pont de Nemours and Company. Formerly in the explosive department, he had been transferred to the Old Hickory Rayon Plant. In 1936, when the rayon department was formed, he became manager of control planning, later being made assistant manager of the nylon division. — FREDERICK J. SHEPARD, JR., *Secretary*, 125 Walnut Street, Watertown 72, Mass.

1914

The last item of these notes in The Review for November told of the death by heart attack of Al Hanson, superintendent of maintenance of the Government Printing Office in Washington. It is with sincere regret that these notes must start off with mention of the death of another Washington classmate. Harold V. Fay, State Department economist, died in Washington on October 8 after a brief illness. Fay came to the Institute from Williams College and after graduation with us took a Ph.D. degree from Harvard. In World War I he served as a captain with our forces in Russia and after the war he taught for two years at the Nanking (China) University. He came to Washington in 1927 as an economist for the Tariff Commission and after the entry of this country into the present world conflict transferred to the State Department. He is survived by a wife and a daughter.

Alden Waitt (officially, Brigadier General, USA) has left Washington again — this time for the Pacific — and was last reported in the center of a very active front. On the way there Alden reported interesting stops in Hawaii and New Guinea. — Dave Sutherland, a lieutenant colonel in the Army, is an executive officer in an operational engineering section of the Eighth Air Force formerly under the command of General Doolittle. Dave was an infantry captain in World War I and before entering the service in this war was engaged in mechanical and air conditioning practice in Minneapolis. He also served as consultant for the Atlantic Oil Refining Company and the Washburn Crosby Company.

Just as these notes are being written, your Secretary has received word that Jim Creighton, who is open hearth superintendent for the Bethlehem Steel Company at Lackawanna, N.Y., is at the Phillips House of the Massachusetts General Hospital for treatment and expects to be there for several weeks. Creighton's son is also an Institute graduate in Mining Engineering in the Class of 1941. He is at present a lieutenant in the Navy.

Your Secretary must confess to having visited recently several points away from his home station and not having made contact with any classmates at the places visited, as he usually tries to do, but again just about every second was accounted for. This last trip was by B-17 Fortress and although stops were made at spots along the West Coast, including Los Angeles and San Francisco, the 6,500 air miles were covered in exactly one week, also including stops for tests in the Nevada desert. He feels particularly guilty for not contacting Bill Lucas, who organized the Southern California 30th reunion, but the visit to the Douglas Plant at Santa Monica was a veritable "on again-off again" affair. He hopes to have better luck next time. — H. B. RICHMOND, *Secretary*, General Radio Company, 275 Massachusetts Avenue, Cambridge 39, Mass. CHARLES P. FISKE, *Assistant Secretary*, 1775 Broadway, New York 19, N.Y.

1915

Nice going, classmates, 144 of you (82 per cent) have given $2,619.50 (89 per cent). Only 14 are left who gave last year who haven't given this year. Why don't you 14 send in your checks right now so we can hit that 100 per cent quota before the end of the year?

Has anyone had overseas letters from St. Elmo Piza or Jim Tobey? — San Willis and I had lunch in Boston on his recent visit here. He was leaving to go with the Missouri Glass Company in St. Louis as a technical consultant. — John Dalton of Pacific Mills, Lawrence, Mass., still corresponds regularly with Lucius Bigelow, who is now a full professor of organic chemistry at Duke University. Lucius recently spent a week end with John in Providence, and I hope soon to have for you a letter from him.

In New York recently I had telephone talks with Hank Marion, Charlie Williams, whose secretary answers with a very impressive "Commissioner Williams' office," and Gene Place. Gene's son, a recent Institute graduate, is at a flying field in Texas, and Gene says "he has already risen to the rank of a buck private." — At the national meeting of the American Association of Textile Chemists and Colorists at Atlantic City, in October, I met Alton Cook, chief chemist for Arkansas Company, Inc., Newark, N.J., Al Sampson, John Dalton, and Ralph Hart. We looked around for Ken King and were sorry to miss him. In New York at the Hart Products Corporation office I saw Sam Berkowitz and Ralph.

Everybody is enthusiastic about our 30th reunion next June. Shortly we shall have committee meetings and will then give you the story. Send in that Alumni Fund check. Help, help, what am I going to write next month? — AZEL W. MACK, *Secretary*, 40 St. Paul Street, Brookline 46, Mass.

1916

We haven't heard anything from Dick Ahearn in a long while. He is now operating under the firm name of Seaboard Weatherproofing Company, Inc., Grand Central Terminal, New York City, a firm which he recently organized. Dick's oldest boy is overseas with the infantry. His youngest boy is working for Pan American Airways. This sounds like the experience most of us fathers are having. — Assistant Secretary Steven Berke, formerly general manager of Coleman Brothers, contractors, of Boston, Mass., is now operating his own firm, known as Berke Moore Company, Inc., at 11 Boylston Street, Brookline, Mass. Maybe in exchange for this publicity, Steven will take time off and write your Class Secretary some news concerning himself and his activities for future use in this column. — George Petit, IV, was recently hospitalized for a minor operation and is recovering satisfactorily. — C. J. McCarthy, I, recently returned from a business trip to England, where he was taken for no less than Edgar Bergen's Charlie McCarthy by two very well-meaning British persons. He managed to forego an invitation and to escape their company without disclosing his real identity. — JAMES A. BURBANK, *Secretary*, The Travelers Insurance Company, Hartford, Conn. STEVEN R. BERKE, *Associate Secretary*, Berke-Moore Company, Inc., 11 Boylston Street, Brookline 46, Mass.

1917

The New York group has been good enough to include one or two Bostonians on the monthly luncheon notice mailing list. As a result your Secretary attended their meeting on September 20, and found it all that had been promised, with Joe Littlefield apparently acting as sponsor, host, and general factotum. The quarters are most attractive, and the discussion and food both satisfying. Win McNeill had other weighty matters that prevented attendance, but the group included Ed B. Payne, A. R. Morton, W. G. Laskey, F. E. McKone, L. C. Roberts, William D. Neuberg, H. E. Wellcome, and Joe Littlefield.

Joe tells us that William A. R. Brown is now with the frequency bureau of the Radio Corporation of America in the R.C.A. Building in New York; Thomas W. Ryan, Jr., is at the St. Johns River Shipbuilding Company in Jacksonville, Fla.; and George Dana Spear has moved to 1446 Fifth Street, Santa Monica, Calif. — Win Swain left the Foreign Economic Administration at Washington early in October to become associated with Keystone Custodian Funds, Inc., with offices in Boston. Win will screen incoming information, coordinate the work of analysts and others, and advise and inform the managers of the several open-end funds controlled by the corporation.

Rear Admiral Forrest P. Sherman's portrait decorated the Boston *Globe* of August 22, illustrating one of the many articles that have been written about his co-operation with Admiral Nimitz in the planning of Pacific strategy. In 1941 Sherman, then a captain, became commander of the carrier *Wasp*, which was sunk by enemy torpedoes in September, 1942. His seamanship is credited with saving the lives of 130 men, and the Navy gave him a Navy Cross and an Admiral's stripes as a reward. At present Admiral Sherman heads the War Plans Division, which assists Admiral Nimitz in the conduct of major moves in the Pacific.

Bill Dennen, a colonel in the Army, writes from Headquarters, South Pacific Base Command, A.P.O. 502, care of San Francisco Postmaster, to the effect that he is still located at New Caledonia although he spent considerable time in the islands up north. He is enjoying that whole section of the ocean in his spare time and has found out a lot about the geology and mining of New Caledonia. The climate there has been wonderful, although when he was on the islands farther north, it was quite warm. "It is only after flying over the area in the

South Pacific that one comes to realize how long the distances are."

It is unfortunate that in these busy times when so many members of the Class are doing important work and have so many interesting assignments no one in the Class has the time desirable for a proper chronicle, to say nothing of a day-to-day or month-to-month running account. Your Secretaries make no apology for the brevity and obvious inadequacies of these notes but do give assurance that they would be delighted to publish material that might be sent them either of personal experiences or as noting the doings of others. — RAYMOND STEVENS, *Secretary*, 30 Memorial Drive, Cambridge 42, Mass. PHILIP E. HULBURD, *Assistant Secretary*, Phillips Exeter Academy, Exeter, N.H.

1918

Perhaps you remember that I was looking for the class grandchild. My notes in one of the last issues of The Review has brought forth the following from Marvin Pierce: "This letter is not to claim the oldest grandchild in the Class, but to dispute Major Giles' right to that honor. My granddaughter was born on November 29, 1942." Now can anyone claim a grandchild older than that? — As Secretary, I sent a note of greeting from the Class to Professor Robert Richards '68, who celebrated his 100th birthday in August, and in return received a card reading, "Professor Richards has received your kind and thoughtful birthday remembrance. He sends his heartfelt thanks and affectionate greetings, and wishes that eyes and strength would permit him to write himself."

A clipping from Phil Dinkins, headed "The Saga of the Seven Engineers," tells the story of seven oil experts who risked lives preparing storage facilities for the Allies all over the world. Among the seven is our classmate, W. B. Engelbrecht. I wish we could hear something of his story from him direct. — Bill Wyer has turned up again. This time an article in the Newark, N.J., *Star-Ledger* headed "Rail Official will have no 'Yes-Men' " gives quite a story on Bill. Bill is now the chief executive officer of the Central Railroad of New Jersey. — Since September 1 our old friend Ted Wright has been administrator of civil aeronautics in Washington. He has been in that town since 1940 in different capacities. — There are a few changes in military rank among our classmates. Sam Chamberlain is now a major; Walt Frazier and Charles W. Lippitt have each been raised from major to lieutenant colonel.

We regret to announce that Harold Connett, Jr., an ensign and son of our classmate, Harold Connett, who is now director of the leather and shoe division of the War Production Board, has been reported missing in action in the Southwest Pacific. I am afraid there may be more such announcements that I should be making, but no others have come to my attention as yet. We are all sorry and send our heartfelt sympathy to Mr. and Mrs. Connett. — Word has also come through the Alumni office of the death of Paul P. Wrigley on May 19. We send our sympathy to his family.

From Pete Sanger comes a clipping from the September issue of *Industrial Finishing* telling of the election of our old friend Sax Fletcher to the position of president of the J. O. Ross Engineering Corporation. The small magazine made one error: Sax's picture had been placed under the heading of an article about an advancement of someone in the Minnesota Mining and Manufacturing Company, and this person's picture had been placed under the heading of "Fletcher becomes President of the J. O. Ross Engineering."

Did the hurricane of September, 1944, upset any members of the Class? The Thomas School was hit again, as in 1938, but nowhere nearly so severely. Instead of five feet of water in the dining room, we had only about six inches this year. Even the tree damage was not so severe. All traffic between Darien and South Norwalk had to pass through the school grounds, as the main road was blocked by four large trees, and as the school road is narrow, we were acting as traffic cops until about ten o'clock the next morning. — GRETCHEN A. PALMER, *Secretary*, The Thomas School, The Wilson Road, Rowayton, Conn.

1919

Will Langille made the 25-year talk at the Class Day exercises on October 28. — J. S. Braverman, X, is now general manager of Empire Corrugated Container Corporation, 360 Furman Street, Brooklyn. He is married and has a son, Richard, 16, and a daughter, Nancy, 13.

Bill Banks writes as follows: "Gene, don't you ever stay at home? I have been in New York three times in three weeks, and am told 'Dr. Smoley is out of town' each time. As you remember, I left the reunion in a rush, just caught a New London bus, ran through the station into the Cape Cod train, and was it hot! Hope to see you soon." — Professor Richards acknowledged the Class's congratulatory message on his 100th birthday as follows: "Professor Richards has received your kind and thoughtful birthday remembrance. He sends his heartfelt thanks and affectionate greetings and wishes that eyes and strength would permit him to write himself."

Al Richards writes as follows: "The last times I have been in New York, I have tried, without much success, to get hold of you. It did not make much difference, however, except to say hello, because I had little or no news to report and nothing in particular to discuss with you. A few weeks ago, when I was in Wausau, Wis., I had dinner with a friend of mine at the Wausau Club and had the pleasure of seeing Jack Stevens '19 for a few minutes at that time. Jack has changed a great deal in 25 years. Like most of us, he has lost some of his hair and put on considerable weight. I understand from his associates that he is doing a bang-up job on the problem of Canadian lumber and pulpwood for the Marathon Paper Mills Company. Although I chased around the country for three weeks, I didn't run into another Technology man."

Fred L. Hunter, who is with the Fansteel Metallurgical Corporation in North Chicago, Ill., writes that he has been traveling for about 80 per cent of the time. — Morris Berk of 24 York Terrace, Brookline, Mass. writes: "I am sorry I missed the reunion. I operate a children's camp in New Hampshire. My married son is in England in radio intelligence and my daughter, 16, at Brookline High. I find your notes in The Review very interesting."

Dr. Marshall C. Balfour has his headquarters at the Hotel Cecil in Delhi, India, and would be pleased to see any Technology men who come that way. Mrs. Balfour is leaving shortly to join her husband. — Wayland S. Bailey, Box 37, Norwell, Mass., writes, "I am on leave of absence from Northeastern University, teaching applied mechanics at Technology for the duration. It seems good to get 'home,' as this is where I began teaching some few years ago." — EUGENE R. SMOLEY, *Secretary*, The Lummus Company, 420 Lexington Avenue, New York, N.Y. ALAN G. RICHARDS, *Assistant Secretary*, Dewey and Almy Chemical Company, 62 Whittemore Avenue, Cambridge 40, Mass.

1921

With this issue of The Review, the Alumni Fund romps down the homeward stretch — a huskier performer than ever before, thanks to the generous giving of more of you. One hundred per cent of our quotas for number of contributors and for amount contributed are in sight. Anyone who has forgotten to send in the card should stop reading right here and proceed to finish the homework on a $15 per capita basis!

A. Warren Norton, XV, has won new business laurels in his recent accession to the presidency of Press Wireless, Inc., the newspaper- and press-association-owned network for transmission of news all over the world. Warrie, whose headquarters are now in New York City, resigned as manager of the Christian Science Publishing Society, a post he has held for the past five years. Boston has lost a director of the New England Council, the chairman of its newspaper salvage committee, a member of the aviation committee of the Boston Chamber of Commerce, of the New England Shippers' Advisory Board, and of the Boston Committee for Economic Development. Warrie is also a director and treasurer of the News Traffic Board, Inc., a trustee of the World-Wide Broadcasting Foundation, and a member of the American Newspaper Publishers Association. He has been active in alumni and class affairs and sponsored the very effective "Technology and Defense" Alumni Day several years ago when he was vice-president of the Alumni Association. He now makes his home in Harrison, N.Y. He is married and has two sons — Edward, who is 20, and Warren, 16.

Robert E. Waterman, X, also wins congratulations for his rise up the ladder of fame. Bob has been elected vice-president and director of the Schering Corporation, pharmaceutical manufacturers, Bloomfield, N.J. More congratulations for his joining the Bardes, Conant, Hawes, Pelkus, and Zoller families in a recent addition to the vital statistics — James Perry Waterman — who is now eight months old. Bob has long been interested in chemical and medical research and was associated with the isolation and synthesis of vitamin B-1 and is secretary of the Williams-Waterman Fund for promoting further vitamin research. He was formerly with the Research Corporation and has been a consultant to the Alien Property Custodian as his special representative in the production of atabrine, the synthetic antimalarial now being used so successfully as a substitute for quinine. He is chairman of the North Jersey section of the American Chemical Society.

John T. Rule, XV, Associate Professor of Drawing and Descriptive Geometry in charge of the Section of Graphics at Technology, is very much in the limelight for having perfected a new method for the training of military navigation students by employing three-dimension pictures called vectographs. Invented at the Polaroid Corporation, where Slide is a consultant, the new technique employs a specially treated plastic sheet on which two pictures are superimposed. Viewing them with special goggles creates the illusion of the third dimension and permits the instruction of an entire class in celestial navigation without the limitations of the old style stereoscope, which could be used by only one person.

New Jersey alumni held their first smoker on October 18 in Newark with George A. Chutter, VI-A, President of the M.I.T. Club of Northern New Jersey, in the chair. The parade was led by 1921 with nine members present, including the two faithful VI-A attenders from Philadelphia, Dugald C. Jackson, Jr., a lieutenant colonel in the Army, and Ralph M. Shaw, Jr. Others present were Phil Coffin, Sumner Hayward, Fred Kowarsky, Ralph Wetsten, Dave Woodbury, and Cac Clarke. So the Editors will not hold up our salary check, we hasten to add that Dave is now on the staff of The Review as an editorial associate.

Military statistics indicate that 144 members of the Class, or almost 16 per cent of all living members, are in the services — 103 in the Army, 40 in the Navy, and one in the Maritime Service. Top ranking officers include 3 major generals, 12 brigadier generals, and two rear admirals. Colonels continue most numerous in the Army group, with 27 men of that rank; 14 lieutenant commanders form the largest group in the Navy. Ten men have been decorated, and one each has been reported killed in action, wounded, disabled in action, missing in action, and died in service.

Glenn H. Easton, XIII-A, has retired as a commander in the Navy and is now professor of marine engineering at the University of Michigan, Ann Arbor, Mich. — Changes of address for other than military personnel are listed as follows: Dr. Frederick W. Adams, X, 898 Park Avenue, New York 21, N.Y.; C. Doane Greene, X, 59 Carlton Road, New Rochelle, N.Y.; Walter A. McKim, 120 Wychwood Road, Westfield, N.J.; Alan L. Morse, IX-B, 119 Hamilton Avenue, Silver Springs, Md.; Clifton B. Morse, XV, 1655 Santa Rosa Avenue, Glendale 8, Calif.

Not long hence we shall observe Christmas and the advent of the New Year. However we shall find it in our hearts to observe them, may they presage a quick and decisive Victory and the early return to that good cheer and fellowship which to Tech men is traditional. — Raymond A. St. Laurent, *Secretary*, Rogers Paper Manufacturing Company, Manchester, Conn. Carole A. Clarke, *Assistant Secretary*, Federal Telephone and Radio Corporation, 591 Broad Street, Newark 2, N.J.

1922

I wish I could reproduce the entire letter which Bill Bainbridge, a captain in an engineer combat battalion, wrote from France to Yard Chittick, but it is too long. It is dated June 13 and describes Bill's experiences on D-Day. He landed on the beach from a landing craft for infantry early on D-Day. He was nicked by a bullet which went between his belly and the beach and has been awarded the Silver Star and the Purple Heart. In due course, we shall undoubtedly hear many other such tales of courage, heroism, and fortitude from others of our Class in active combat. We are proud of Bill and look forward to his safe return.

Godfrey Speir, who in peacetime is a patent attorney with Wright Aeronautical Corporation and is now a major in the Air Forces, writes from Washington: "We Pentagonians, while cool in the summer, lead a tough life of paper pushing or quill driving, as the Duke of Wellington once called it. We are a necessary evil but hope that once in a while we do something to help win the war. I see Colby Bryden and Dave Minton occasionally. Please give my regards to the gang." Speir's present address is 625 South Fillmore Street, Arlington, Va.

Reed Dallye, who is with the Aluminum Company of America, has been transferred to the Albany sales office from Pittsburgh, where he has been for the past several years. We wish Dallye success in his new assignment. — The directory is progressing and should be in the mail before the end of the year. — Clayton D. Grover, *Secretary*, Whitehead Metal Products Company, Inc., 303 West Tenth Street, New York, N.Y. Whitworth Ferguson, *Assistant Secretary*, Ferguson Electric Construction Company, 204 Oak Street, Buffalo, N.Y.

1923

There are a few items this month of men reported at new locations. Clark Barrett is with the Synthetic Division, United States Rubber Company, Torrance, Calif. Alexander J. Tigges is with the Baldwin Locomotive Works, Paschall, Pa. Gordon T. Williams is with Pratt and Whitney at East Hartford, Conn.

A clipping from the New York *News Record* announces that Joseph M. Levinson and his son have offices in Los Angeles, where their firm is West Coast representative of Metric Hosiery Company, New York manufacturers' agent. Levinson's son, an Ohio University graduate, is at present in the Army, but expects to be associated with his father again after the war. — Horatio L. Bond, *Secretary*, 457 Washington Street, Braintree 84, Mass. John M. Keck, *Assistant Secretary*, 207 Bloomfield Avenue, Bloomfield, N.J.

1924

A most welcome visitor to the Secretary was Don Moore, a lieutenant colonel in the Army, who spent a few days in Boston in late September between a period of duty on the West Coast and an expected departure for action in the Pacific in an antiaircraft command.

A letter from Hank Shore, also a lieutenant colonel, in Washington doing research and development work on communications, comes to us via Anatole Gruehr and reads as follows: "On June 10, about a dozen of our Class who were in Washington had dinner to celebrate the 20th anniversary. The dinner was arranged through the efforts of Johnnie Fitch. Perry Maynard, now a lieutenant colonel in the Signal Corps and right-hand bower to General Stoner, was present, unchanged. Henry Simonds turned up halfway through the meal with a walrus mustache and general seafaring look that made everyone think of Glencannon. Henry is chief engineer on one of the Liberty ships and has had some very exciting experiences in the Indian Ocean and elsewhere. It was a swell party, and I was happy to have been present. On one of my trips, I ran across Lieutenant Colonel Ward, a Course VIII man who is now commanding officer of the Little Creek Mine Command. We had some pleasant dinners together, and he was surely a blessing in extending the facilities of his command to us."

Anatole also reports that Bill Correale, a major, now attached to the headquarters of the Fourth Army at Fort Sam Houston, Texas, was in New York recently on leave. — Bill Giddon, according to the newspapers, has become vice-president and merchandise manager for A. Sandler Company, Boston Shoe manufacturers. Bill was formerly buyer-manager at Bamberger's in Newark. — Baird Snyder, according to the Washington *Times-Herald*, is deputy administrator of the Federal Works Agency and director of its war public works program, and "right now busy planning construction of hundreds of millions of dollars' worth more in necessary public works." — Francis A. Barrett, *General Secretary*, 50 Oliver Street, Boston 7, Mass. George W. Knight, *Assistant Secretary*, 36 Arden Road, Watertown 72, Mass.

1928

Some of you may not have heard that our classmate, Jack Collins, died of a heart attack on March 30. The Class extends its sincerest sympathies to Jack's family. His passing has left real sorrow in our ranks.

Charlie Southwick is now director of research and development of the Shellmar Products Company, Mount Vernon, Ohio. In talking about a recent trip to the Packaging Show in Chicago, he mentioned that he had seen Carl Whittier '27 and Ed Pitt, of Sherman Products in Boston. Charlie is living on a farm in Mount Vernon and enjoying life tremendously. — The Foxboro Company, makers of industrial instruments, have announced that Walter Ridley has joined their sales promotion department in Foxboro, Mass. Before joining Foxboro, he was engaged as designer and sales engineer for two well-known firms manufacturing textile machinery. — Tubby Grover, captain of the swimming team in our junior year, left Manville-Jenckes in February, and is now a college professor in charge of the yarn manufacturing division at the school of textiles, North Carolina State College, Raleigh, N.C. Tubby would welcome seeing any classmates in and around that territory.

John C. Leslie is doing a great job with the Pan American Airways as manager of their Atlantic division which handles transatlantic flights to our allied countries in Europe. — A. A. Archibald has returned to Pittsburgh after two years in Washington in the steel division of the War Production Board, to which he was loaned by Jones and Laughlin Steel Company. He is married and has one child, a boy, 1½ years

old. — H. L. Geiger is manager of the International Nickel Company's development and research office in Chicago. — Tom Harvey was elected chairman, for 1944 and 1945, of the Indianapolis chapter of the American Society of Metals at the recent meeting.

George Palo has left the Tennessee Valley Authority, with which he was very active in all its recent jobs, and is now a lieutenant in the Navy trained in ordnance at Fort Schuyler. — Harlan Jessup is now resident assistant supervisor of shipbuilding in the Navy. His address is American Shipbuilding Company, Lorain, Ohio. Prior to his Navy duty he spent a year in research on nitrocellulose, 2½ years in paper manufacturing, 2½ years with a petroleum refining company, and over four years on Diesel sales engineering on marine motors. — Arthur Josephs is now a lieutenant commander in the Navy. He was married in April of this year. — John Ryan is now a lieutenant in the Navy in the procurement division.

Don Sturznickle is in the refinery engineering division of the Texas Company in New York. He has sent us the following interesting letter from his pal, René Simard, a member of our Class who is now a flight officer in the Royal Canadian Air Force. René is pilot of a Sunderland flying-boat bomber of the Coastal Command in the British Isles. He says: "You know, of course, what kind of work I'm doing here. On Friday the 10th, I had quite a lovely day — our very first real trip and, with beginners' luck, we hit the jack pot — yes, sir, with beautiful pictures to prove it — and nobody got so much as a scratch, although there were a few close shaves, yours truly for one. Boy, oh boy! What a thrill that was! Now, as the squadron leader told me, 'You've only got 788 hours to go, and you haven't seen anything yet!' You have probably figured out that the jack pot was a U-boat." René married Pamela Archibald of Bronxville, N.Y., in 1940, and they have a 2½-year-old son. If you, or any of the fellows, want to write to René, his address is: F/O R. Simard, C26181, 422 Squadron, Royal Canadian Air Force, Overseas. He has a lot of idle time and would be glad to hear from any of you. — George I. Chatfield, *General Secretary*, 6 Alben Street, Winchester, Mass.

1934

Robert C. Becker has certainly done his share in the war effort, and it gives us a great deal of pleasure to be able to pass on to you some letters from him. The first to Professor Locke, dated June 10, reads in part: "I know you have been keeping up with the news, and having done so, you are probably not very much surprised to hear that our outfit was in on the drive for Rome. We've been through every day of it from beginning to end. Better still, ours were the first Allied troops to enter the city, a signal honor indeed. I am not at liberty to mention the route we took to Rome, nor can I say anything of the fighting we did, but I can assure you that we did ourselves and the Fifth Army proud in all our actions. . . ."

To The Review on August 30 Bob writes: "Our outfit pulled off another first, this time in getting ashore for the invasion of southern France. Jerry doesn't seem to have been satisfied with robbing me of a thumb because on August 23 he made a bold attempt at getting an eye when one of his Teller mines went off about seven feet from me. He wasn't successful, however, the net result being that I felt and looked as if someone had fired a load of buckshot at my right arm, shoulder, and chest. A few slivers dug themselves into my right eye, and the concussion caused the drum of my right ear to become perforated. The long and short of the whole affair is that I am once again in a hospital, all healed except for the ear, which makes me feel that I'm housing a wind tunnel in my head whenever I have to blow my nose. Uncle Sam is a pretty good egg about these things and says I can now add an Oak Leaf Cluster to the Purple Heart he gave me last January. Uncle Sam has also been nice to me in another way: a few days ago he changed the color of my bar from gold to silver. I could hardly believe it when the glad tidings were brought, because I had long ago come to the conclusion that in the Army some people are promoted, while others never will learn to be polite to, and stop arguing with, their commanding officers."

F. William Wessel, who had been engaged on a mining job at the Surcease Mine, Oroville, Calif., changed his job early in the year by going back to the Bureau of Mines; but instead of returning to Reno, where he was formerly stationed, he went into the sponge iron testing plant at Boulder City, Nev., where his present residence is, at 520 New Mexico Street. He reports that he is having a very interesting time struggling with the difficulties that arise in the development of any new process. For a while he was working on the analysis of sponge iron and trying to get a standard procedure which would give satisfactory results. More recently he has been in the plant trying to put through test runs and correcting faulty apparatus which failed in actual operation. He reports that Mrs. Wessel joined him in Boulder City last March after having undergone an operation in San Francisco, and they have been living very comfortably in one of the Defense Homes Corporation houses. The city is apparently run by the Bureau of Reclamation, which limits the number of stores, so that the cost of living is a little high. Although the thermometer also reaches high levels, the heat is never so oppressive as in some summer days on the New England coast, and the high winds which prevail at times do not bother Wessel in the least, so he says.

Brad Ellenwood forwarded a bit of news. He says: "My nose has been, and still is, held to the grindstone to such an extent that news has been nil. One of the individuals who is doing the shoving is our new, and only, son, John, born May 21 and tipping the scales at 8 pounds, 3 ounces. At the moment it is hard to decide whether he should be president when he leaves the old factory, or a tugboat captain."

Robert L. Smith, a lieutenant in the Marine Corps, was married on September 2 to Ruth Lillian Hammond, daughter of Andrew G. Hammond, of Danvers, Mass. The couple will live in Cherry Point, N.C. — John G. Callan, Jr., *General Secretary*, 184 Ames Street, Sharon, Mass. Robert C. Becker, *Assistant Secretary*, 169–49 24th Avenue, Flushing, N.Y.

1937

I must apologize for almost missing The Review last month. Your humble Secretary was on a two weeks' tour just prior to the dead line and barely managed to get in the brief note you may have detected. I make the rounds now and then to a few of the eastern war centers, including Detroit, Chicago, Cincinnati, Buffalo, Rochester, Boston, Washington, and sometimes others like Keene, N.H., to investigate the workings of the Kingsbury, or to Hudson, Mass., to broach the subject with Lapointe, or to Springfield, Vt., for work with Fellows, or here and there on various business. I should be glad to get together with any of you fellows on these jaunts if only I knew where you are. Conversely, if you are in this neighborhood, which includes New York, let me know, and if possible we will get together. Bob Fischel, now a major stationed at Dover, Del., was here last week end, and I've seen Herm Speh once or twice in New York; as you know, he is project engineer at Sperry.

I have the unpleasant duty of informing you of two deaths of our members during the past year. The first was that of Ellis J. Siegel, of 52 Ashland Street, Medford, Mass., in January. Further details are not, at present, available. The second was Captain Andre Laus, who was killed in action in France on August 29. Memorial services were held at the French Church on Isabella Street, Cambridge, Mass., on October 28.

Jones Shea of 52 Melvin Street, Lawrence, has been transferred from the Medical Corps of the Army to the Coast Artillery and is now serving overseas. James D. McLean, of Framingham, is active in the expansion of television throughout the country, as commercial engineer for the General Electric Company of Schenectady, N.Y. Reland B. Westgate, who is serving as assistant to supervisor of shipbuilding at Wilmington, Del., has recently been raised from the rank of lieutenant to lieutenant commander. Robert H. Thorson, of 15 Abbott Street, Medford, Mass., has been promoted from captain to major in the Army Engineers. Vladimir Haensel has shared in wartime research leading to economical production of the new aviation fuel "triptane."

Robert S. Childs, of Englewood, N.J., and Margaret Crotzer, of Rutherford, N.J., announced their engagement in May. Childs, a member of Phi Delta Theta, is an engineer with Bendix Aviation Corporation. They were married on June 8 at the Presbyterian Church in Rutherford. Van Buren Nelson Hansford, of Harrodsburgh, Ky., a lieutenant (junior grade), and Jane Harris, of Rochester, N.Y., were married in May. Priscilla Jane Corduan was married to John James Currier Coffin, an ensign in the Navy, on March 11 at the Princeton Chapel, Princeton, N.J. David F. Tuttle, Jr., a lieutenant in the Navy, was recently married to Becky Jane Hayes, of Detroit, Mich. — Winthrop A. Johns, *General Secretary*, 34 Mali Drive, North Plainfield, N.J. Philip H. Peters, *Assistant Secretary*, 159 Glen Road, Wellesley Farms 82, Mass.

1938

Last month we reported the engagement of Blaine Fairless to Caroline Sproul. We now have word that they were married on

August 20 in San Francisco. Blaine, a lieutenant in the Navy, had just returned from active duty in the South Pacific. They had a brief wedding trip in the East, after which Blaine was stationed in Miami, Fla. Joe Bryan was married last spring in Boston to Mary E. Moran.

Edgar Taft is in the Army Medical Department and is chief of laboratory service at a station hospital in the Panama Canal Department. He has recently been promoted to the rank of captain. Theodore Burke is also a captain, but in the Foreign Ordnance Intelligence Division and is attached to the American Embassy, United States Military Mission, at Moscow. He has previously served in Africa, Sicily, and Italy and has been in Moscow since last March. Before going on active duty in April, 1941, he worked for the Youngstown Sheet and Tube Company.

We have sad word that Daniel Spengler was killed in action in Normandy on July 8. He was a colonel in the Army Corps of Engineers and was serving with Lieutenant General Omar N. Bradley. Before going to England last December, Dan had completed a mission in the South Pacific. He leaves his wife and three children, Daniel, Jr., David, and Jane. The Class feels very keenly the deaths of members reported in this war. — DALE F. MORGAN, *General Secretary*, Carbide and Carbon Chemicals Corporation, 30 East 42nd Street, New York, N.Y. ALBERT O. WILSON, JR., *Assistant Secretary*, 32 Bertwell Road, Lexington 73, Mass.

1940

Ed Seim gave us the surprise story of the month. A report was received that he was married in New York about the middle of October to Maureen Ainsley of England, who is a Royal Navy Wren. The last time he was in the port of Boston Ed told of some of his travels as gunnery officer aboard British troop transports. A captain in the Coast Artillery Corps, Ed has done about as much sailing as any soldier we have met. We have no details of the wedding except that, a few weeks or perhaps days after the wedding, she sailed away to England, and he was left in New York. Our best wishes are that the fortunes of war favor them with a speedy reunion. — William R. White, a lieutenant in the Navy, and Mrs. White, now of Boston, announced the birth of a son, Thomas Crawford White, on September 22, weight 8 pounds 8 ounces. Herb and Margaret Holloman also now have a son, whom they have named Jonathan. Herb, now holding the rank of captain in Army Ordnance, is at the Watertown Arsenal.

A good bit of news was received on the forms sent out to the Class by Tom Creamer. From them we find out exactly what the Class is doing. Bob McKinley was sent by the Bureau of Ships on a five-week flying trip through the South Pacific early this last summer to do a special job for the electrical design section of the Bureau, where he works. He does not say exactly what he did, but at least he saw Glen Guernsey, Arnie Mengel '41, and Bill Schubert all in one half hour and one bachelor officers' quarters. He also talked with Bill Roper '38. Bill Wood sends word about himself and his family from Wilmington, where he is a results engineer with Du Pont. Bob Pearson is a major in the Air Forces. As late as August he was stationed at the Headquarters of the Third Fighter Command at Drew Field, Tampa. Almost everyone gets across the Pacific these days. Ben Bosher flew out from California in a Curtiss Commando to an island somewhere after a stop at Honolulu and Waikiki Beach. He is a first lieutenant in the Marine Corps and must be where there are planes and marines to fly them. Best of luck, Ben!

Bob Nelson, a lieutenant in naval aviation, has seen plenty and must have much to report that will have to wait. He has been in the Navy about three years now and for two has been flying with a squadron aboard "the most battle-scarred carrier in the Pacific." In one escapade at Truk he was shot down and then rescued by a submarine, as Navy fliers are. He is coming home with a Silver Star, a Distinguished Flying Cross, and an Air Medal. One of his big jobs was the time when, at the end of a 325-mile search flight, he first came in contact with and reported a good part of the Japanese fleet and so started a considerable fray. The next morning, after he was launched again to scout them out, he found what was left 400 miles away, headed west. As that was too far distant for bomber action, Nelson's job was to observe and make estimates of damage.

Francis J. Crimmins, a lieutenant in the Army, was killed in action in Holland on September 15 while commanding an engineer company of an armored division. On active duty as a reserve officer since September, 1942, Frank was a veteran of the campaigns in North Africa, Tunisia, and Sicily. In Course VI at Technology, he also played lacrosse for four years, was active in the Catholic Society, Phi Kappa fraternity, the American Institute of Electrical Engineers, and the American Society of Military Engineers. All of us sincerely regret the loss of a classmate and friend. — H. GARRETT WRIGHT, *General Secretary*, 1040 Lombard Street, San Francisco 9, Calif. THOMAS F. CREAMER, *Assistant Secretary*, Apartment 436, 2032 Belmont Road, Northwest, Washington, D.C. JOHN L. DANFORTH, *Acting Assistant Secretary*, Room 24–222, M.I.T., Cambridge 39, Mass.

1941

In the news that has gathered on our desk, the first item is that Gage Aborn has received his majority. Al Bensusan, an Army captain, while listing an A.P.O. address somewhere in China-Burma-India, intends to spend this Christmas at home. Robert W. Blake, a captain in the Navy, who was decorated for gallantry and leadership in the North African landing, returned to Washington long enough to walk up the aisle with Helen Lindsley Brown on the 24th of September. Hubert R. Chaffee is now a commander in the Coast Guard, stationed at the district Coast Guard office in New York City. Tom Campbell, who is A.P.O.-ing out of New York City, has received his captaincy. Paul Branning is with Bethlehem Steel Company on Staten Island. Ed Borrebach is listed as a Gunnery Unit man out of Norfolk. — Al Booth, an ensign in the Navy, is at Norfolk as well. George Bises is a private with one of the European Civilian Affairs regiments — certainly not in the South Pacific. We have a notice that your Secretary's address in Dorchester is out-of-date and that the Quartermaster Depot in Philadelphia is the place to write. Cambridge, however, is still the place to write when you send in your contribution to the Alumni Fund. The share of 1941 in the fund has been good — no reason to change its standing now.

Bill Anderson, a Navy lieutenant, is serving with a destroyer escort out of New York City. Irv Foote, an Army lieutenant, is A.P.O.-ing out of San Francisco. Pedro Galarza has us wondering whether it is the Chilean army in which he is a lieutenant, a possibility which seems quite logical with a Chilean address. Glen Guernsey has received his second full stripe while attached to the staff of the Commander Air Force Pacific Fleet; Clif Hahn and Dick Knapp, as Navy lieutenants, and John Richards, as a lieutenant in the Air Forces, are all out there. Among the New York A.P.O.'s are Major John Hirst, Captain Ed Sumner, Lieutenant Bob Alfred, Lieutenant Al Leonard, Lieutenant Alex Poskus, Captain Nat Sage, Jr., Lieutenant Carl Stewart, Lieutenant Bill Sheard, Captain Joe Myers, and Lieutenant John Hermistone. We received a neat notice from Mrs. Hermistone telling of a new member of the family — our congratulations forthwith. We rub our eyes at the news of Bill Jones' present rank of colonel — Bill, formerly listed as a captain — ah, these Air Forces.

Erling Hustvedt, a lieutenant in the Navy, is down in Miami. Hal Radcliffe has recently received those gold leaves. Dave Herron has left Maine for Schenectady. Harrie Quackenbos is still running, we hear, in Newark; we missed Harrie in a Philadelphia road race but shall probably find him at the next meet. Bob Schwering has changed from the Army and is now wearing a single ensign's stripe at Corpus Christi. Howard Simpkins is out at Douglas Aircraft in California. Sam Solar is sporting a stripe, and Stan Smolensky has received his railroad tracks. Larry Turnock has finished a tour at the Command and General Staff School. Victor Wagner is a major in the Air Forces. Ted Walkowicz and Bob Williams, both captains, and Blinn Russell are all out at Dayton; while at the nation's capital are Arthur Cumberledge, a commander in the Navy, Bob Holdman, Howard Dilts, a lieutenant in the Marine Corps, Charles Corliss, and Cedric Chandler, a radio technician, first class. Paul Carlson is back in civvies, having done a fine job in the service. Louise Houssiére is now Mrs. James Herrington, Jr. George Clark, a major in the Army Air Forces, has left Philadelphia and was at Dix the last we heard. Sorry we missed him.

Dick Barnard, a lieutenant in the Marines, is in the Pacific. George Brown is at Northwestern Tech. Walt Kern, a lieutenant in the Signal Corps, Bud Ackerson, a lieutenant in the Ordnance Department, and Rog Blum, a lieutenant in the Navy, are all in Philadelphia. We met Bud, Rog, and Sam McCauley at a recent Technology Club dinner. James Killian of the Institute spoke of Technology problems in the postwar period; they are numerous. Harvey Pofcher is a sergeant, A.P.O.-ing out of San Francisco. T. Fabik received his promotion recently from lieutenant commander to commander; Ray Koch, stationed in Arizona, received his tracks recently. We met

Captain Rog Finch of Jeffersonville Quartermaster Depot (never heard of it) at a recent meeting of the American Society for Testing Materials in New York City. Rog tells of a visit from Mert Richardson, an Army captain stationed at the Chicago Quartermaster Depot, while on a trip to Fort Knox for field tests on one of the G.I. rations. Dave Pepper, of the Marine Corps, has received a promotion to captain. John Knox has picked a prefix of private.

We have announcements of the engagement of Antoinette MacIver to Al Kusch of Philadelphia; of Mary Stewart, a lieutenant in the Army Nurse Corps, to John McCarthy, a major in the Air Forces; of Ensign Mary Haberkorn to J. Christy Conner, Jr., a lieutenant in the Navy. Recently married were Louise Bowden and Hugh Spaulding. Ruth Laubinger and Bill Harris, a lieutenant in the Navy, were married in Washington, where they will make their residence. In a letter to Jack Tyrrell '43, Bob Casagrande tells of Stan Marple's recent marriage to a Massachusetts girl.

We regret having to tell of the death of two of our classmates. Roger W. Butler was killed in an accident on November 2, 1942. Howard W. Wade, a lieutenant in the Navy, was reported killed on June 15. We have little other information about these tragic events. Again we regret the delay in reporting. Our expressions of sympathy and sorrow are none the less sincere. — STANLEY BACKER, *General Secretary*, Philadelphia Quartermaster Depot, 2800 South 20th Street, Philadelphia 45, Pa. JOHAN M. ANDERSEN, *Assistant Secretary*, 12 Ware Street, Cambridge 38, Mass.

1942

It would be a triumph of overstatement if I were to suggest that the mailman who keeps me well supplied with bills, dope sheets, and political propaganda also kept me well supplied with news of the whereabouts of the wandering members of 1942. The past month, to be specific, brought me a letter from Fred Baumann and another from Jerry Coe, not to mention 11 also-rans. Since Fred's epistle, moreover, included some others, this month cannot be strictly classified as a dry run.

Bernie Levere sent in a V-mail from England, where he is completing his second year. Recently he ran across Bruce Anderson, a captain, and Charley Speas, a lieutenant, who were on their way to France with an Ordnance outfit. Marty Levene, an Army captain, is also in France with an antiaircraft outfit which has nailed quite a collection of Jerry planes. Ade Marcuse, a lieutenant in the Army Air Forces, is due back in the States after two years in the Pacific. We learn that J. J. Mulvaney, the "sarge" of Company D in our freshman R.O.T.C. and now a lieutenant in the Coast Artillery Corps, has been and may still be in the Admiralty Islands.

Alan Katzenstein pens us to the effect that he has been flopping around in some of Africa's grade A mud for 17 months. He claims that chemical officers don't have much to do along business lines and that he has "additional duties" to make life interesting. The reader is invited to draw his own conclusions as to what these entail, but from what we have heard of Africa, sarongs are out. Max Kaplan, Charley Prohaska, and Dan Schaeffer are all in India, but that is all that we know about them. Bob Boyer was in a bomb group some 12 miles from Alan, and, as usual, it was many months before they found out about it.

News clippings bring the following tidbits to our attention. Dexter Wells, one of the Course IV characters, has been appointed an assistant planner by the Buffalo City Planning Commission. Alex Hancock, a lieutenant in the Navy, is now assistant superintendent of construction on three warships at the Philadelphia Navy Yard. Alex, some of you may remember, received the American Bureau of Shipping award for his outstanding record at the Institute. Wilton Fraser, who left the ranks of '42 in 1941 to enlist, has received an Oak Leaf Cluster to add to his Distinguished Flying Cross for "extraordinary achievement" while serving with the Air Transport Command in the South Pacific. Luis Lim is now serving the research department of Northrop Aircraft Company.

The department of knots and splices lets us in on the down-the-aisle propositions every once in a while, so let's get up to date with what information we have. Robert Gage, a "Phi Bate" from 'way back, duoed with Rosalind Schang of East Norwalk, Conn., last June. Technology and East Norwalk presumably met through the medium of Wellesley. John Corbett, who left school in 1941 to enlist, tied in with Grace Hayes of Peabody, Mass., last June. Miss Hayes attended both Regis and Simmons. Frank Conant and Jean Hadley, both hailing from Melrose, Mass., Ido'd in June, also. Akbar Brinsmade, currently chemical engineering for Shell Oil, and Juanita Phillips, at present laboratory technician for the same company, decided to work together on a 24-hour basis. In the normal course of events they teamed in Texas sometime in June. John Markell received his commission as a pilot in the Naval Air Service on May 9, and a few days later he received Josephine van der Voort as Mrs. Markell. The bride claims Fredonia, N.Y., as her home town.

Herb Howell, flight project engineer for Wright Aeronautical, weighed in with Carol Eckert of Red Bank, N.J., on May 28. The bride is Wellesley '43. Course X comedians will be glad to learn that Harry Zimmerman, he of the checkered vest and gambler's watch chain, took unto himself Evelyn Johnson last July. Harry, you recall, was a graduate student and department stooge during our senior year.

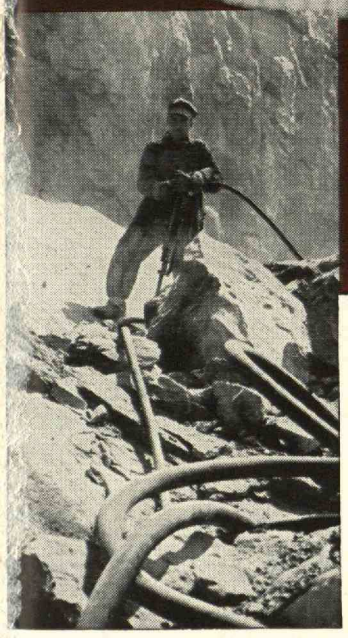
Prexy Coe is now in the DD (destroyer) pool at the Naval Operating Base, Norfolk, Va., awaiting orders, after spending 15 months in assorted schools and cram closets. Norfolk being what it is, Mrs. Coe is job-hunting in Schenectady. At last reports, the Big Boss was in the process of altering several habits. Jerry also mentions an enormous binge that took place at the palatial Seeley summer estate in Stamford, Conn. Included were the Bruckmanns, Hendersons (3), and Seeleys (3), not to mention the usual crew of bar-flies that can always be counted on from the Chi Phi fratenary club.

We doff our hats in way of welcome to Shep Tyree, who is about to join this august journalistic group hitherto comprising only Freddie Baumann and yours truly. As soon as we get ourselves straightened out, we hope that the addition will mean more news of you for you. In the meantime, if there is anything that you don't like, or do like, or want included, or want deleted, just let me know about it. Perhaps we can start a controversy. Anyhow, so long for a while, children, and many thanks for the Alumni Fund contributions. — FREDERICK W. BAUMANN, JR., *General Secretary*, Orchard Lane, Golf, Illinois. *Assistant Secretaries:* KARL E. WENK, JR., 11 Ledge Road, Old Greenwich, Conn.; S. YOUNG TYREE, JR., Room 2–215, M.I.T., Cambridge 39, Mass.

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5—Withstands high pressures and surges with wide margin of safety
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7—Less elongation and expansion
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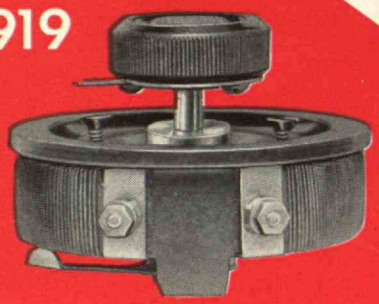
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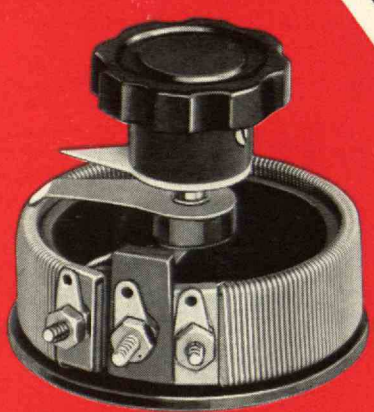
1919



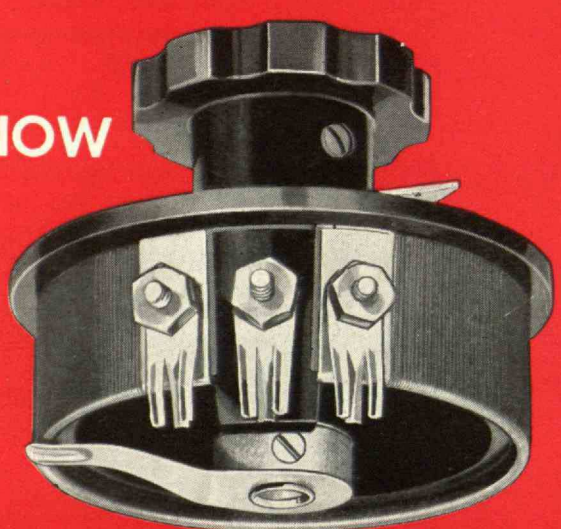
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